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AFG: Transport Network Development Investment Program (Beharak–Eshkashim Section)

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CURRENCY EQUIVALENTS

(as of 28 October 2014) Currency Unit-Afghani (AFN) AFN 1.00 = \$.01734 1 USD = 57.65 AFN

ABBREVIATIONS

| ADB | - | Asian Development Bank |
|-------|---|---|
| IEE | - | Initial Environmental Examination |
| EIA | - | Environmental Impact Assessment |
| EMMP | - | Environment Management and Monitoring Plans |
| EPA | - | Environment Protection Agency |
| ESS | - | Environment and Safety Sector |
| FD | - | Forest Department |
| IUCN | - | International Union for Conservation of Environment |
| MPW | - | Ministry of Public Works |
| MSL | - | Mean Sea Level |
| NEQS | - | National Environmental Quality Standards |
| NEPA | - | National Environmental Protection Agency |
| NRVA | - | National Risk and Vulnerability Assessment |
| PD | - | Project Director |
| PIU | - | Project Implementation Unit |
| RMU | - | Road Management Unit |
| ROW | - | Right of Way |
| SOP | - | Standard Operational Procedures |
| TNDIP | - | Transport Network Development Investment Program |
| UNEP | - | United Nations Environment Program |
| WB | - | World Bank |
| WWF | - | World Wildlife Fund |
| | | UNITS |
| cm | - | Centimeter |
| ha | - | Hectares |
| hr | - | Hour |
| kg | - | Kilogram |
| km | - | Kilometer |
| m³ | - | cubic meter |

| msl | - | mean sea level |
|-------------------|---|---------------------------|
| m | - | Meter |
| km ² | - | square kilometre |
| m ² | - | square meter |
| mg/L | - | milligram per liter |
| μg/m ³ | - | microgram per cubic meter |
| ppm | - | parts per million |
| | | |

NOTE

In this report, "\$" refers to US dollars.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

GLOSSARY OF ENVIRONMENTAL TERMS:

Direct or Indirect Impacts. Most physical and hydrological impacts are direct; ecological and social impacts are often indirect or secondary in nature.

Environment. Environment is the totality of the natural and human surroundings and includes biophysical components of the natural environment of land, water, air, inorganic and organic matter both living and dead; and socio-economic components of the human environment including social, economic, administrative, cultural, historical, archaeological, land and associated resources, structures, sites, human health, nutrition and safety.

Environmental Planning. Planning activities with the objective of preserving or enhancing environmental value.

Environmental Impact. Environmental impact is a change in the state or functioning of an environmental resource or component caused by the actions of a project or intervention. It should be distinguished from the impact to resources or components caused by natural factors, e.g. floods, cyclones.

Environmental Impact Assessment (EIA). Environmental Impact Assessment is the systematic study, assessment and reporting of the impacts of a proposed programme, plan or project, including a plan for dealing with negative impacts.

Environmental Management Plan (EMP). An Environmental Management Plan is a programme or plan to undertake an array of follow-up activities to provide for the mitigation of adverse environmental impacts and enhancement of beneficial effects. It is also sometimes called an Environmental Protection Plan.

Environmental Management System (EMS). An Environmental Management System is designed to provide a structured and systematic approach to overall environmental management. It covers policy, procedures, stakeholders, responsibilities and audit mechanisms.

Encroachment. Encroachment is occupation, temporarily or permanently, of Government land by private individuals. It includes erection of buildings or other structures and the intrusion of balconies, porches or other projections. It also includes occupation of Government land beyond the prescribed period.

Environmental Standards (ES). An environmental standard is defined here as an environmental threshold value establishing maximum or minimum limits for the criteria by which key parameters are measured.

Erosion. Removal of soil particles by the movement of water.

Environmental Auditing (EA). Environmental Auditing is a systematic, documented and verifiable process designed to ascertain whether the EMS helps the organisation to meet the required standards of environmental performance, fulfil its legal obligations and achieve what it claims to be achieving.

Habitat. Division of the environment having a certain combination of physical (drainage, soil type, slope) and biological factors necessary for sustained animal, plant or human use and survival.

Important Environmental Components (IECs). Important Environmental Components are components which, by virtue of their importance to ecosystem functioning, production of food or maintenance of livelihoods and quality of life, are considered essential and worthy of sustaining at existing or enhanced levels under the proposed new project regime.

Initial Environmental Examination (IEE). Environmental assessment undertaken for a regional or feasibility level study for identifying and assessing possible environmental impacts.

Mitigation. Mitigation is any action taken to reduce unacceptable negative impacts. It includes both design changes to the project and operational strategies (i.e. compensation).

Reversible Impact. An environmental impact that recovers either through natural process or with human assistance.

Stakeholders. Stakeholders are all persons and groups having a justifiable concern and interest in the project and its impacts. Stakeholders include local people of different professions, representatives of the Government, overseas donor agencies and NGOs.

Scoping. Scoping is a process whereby the Important Environmental Components, project development issues and concerns of local Community are determined.

Sustainable Development. Development that ensures preservation and enhancement of environmental quality and resource abundance to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Sediments. Unconsolidated materials derived mostly from pre-existing rock through erosion, weathering, etc.

Topography. A detailed description or representation of the features, both natural and artificial of an area

EXECUTIVE SUMMARY

Introduction: The Project involves improvement and reconstruction of the existing road connecting Beharak to Eshkashim passes through Beharak–Warduj–Zebak–Eshkashim Districts in the North Eastern Region of Afghanistan. The review of acts and regulations of Afghanistan related to environment, it is found that the project does not infringe upon any of the laws and regulation. It also does not contravene any of the international treaties or conventions to which Afghanistan is a signatory. According to Asian Development Bank (ADB) Guidelines on Environmental Assessment and Safeguard Policy Statement 2009 it falls in "B" category, for which Initial Environmental Examination (IEE) is sufficient. So this IEE report has been prepared as part of the Feasibility Study undertaken between May 2014 and September 2014.

Project Description: The project has been studied mainly for one option (Option-3). Two more options were initially rejected after reconnaissance for being unsuitable technically and environmentally. The alignment under third option starts at Beharak (N 36.97273 E 70.90966) at 1448 m asl and ends at Eshkashim (N 36.69614 E 71.52021) 2453 m asl via Warduj (N 36.91696 E 71.061192) 1653 m asl and Zebak (N 36.56628 E 71.29194) 2535 m asl.

At present the road is a gravel or earthen track having widths varying from 3m to 9m at different reaches. The proposed road is conceived to make a part of the existing road network connecting major towns of Afghanistan. This road is located in the North-East of TNDIPT-4.

The proposed project will involve the following, viz.

- (i) reconstruction and improvement of 108 km. two lane road from Beharak to Eshkashim.
- (ii) Construction of five bridges along the alignment.
- (iii) Construction of 358 structures.
- (iv) improvement of the horizontal/vertical curve and increase embankment in several part of the road and
- (v) improvement of traffic sign by marking cross walk, signs and other safety features

The improvement and reconstruction of the road aims to achieve the AASHTO design standard by using the software of MX Road XM V8i with the following features

- (i) for flat, rolling and mountainous terrain, each of the two lanes would be 7m wide with a 2m shoulder; and
- (ii) crown cross slope of 2.5% to 3% depending on the pavement surface and maximum super elevation will be 8%.

The construction components would include development and placement of sub-base, base, top and pavement. The pavement is proposed to be made of asphaltic material. Hard material for sub-base and base are available almost all throughout the alignment. Top materials for pavement are mostly black stone and these are available at specific points of the alignment. Materials like cement, bitumen and asphalt will be brought from outside.

The construction will require earth filling, earth cutting and rock blasting in the preparation of the base of the road. The blasting will require the use of detonators of different sizes. Stone crushing will be required for meeting the need of paving.

The construction work is expected to start in the end of 2015 and is scheduled to be completed in three and half years.

DESCRIPTION OF THE ENVIROMENT

Physical Environment: The Beharak to Eshkashim Road passes through flat, undulating, hilly to mountainous terrains with altitudes ranging between 1448 m and 2984 m under study. The altitude at Beharak the starting point is 1448 m; it rises to the highest level of around 2984 m at a distance of KM 96+753 in Bazgir areas. The road alignment crosses a mountain ridge at KM 96+000 and slopes down to the Valley of Wijling River. The road level gradually falls to 2535 m at Zebak but at times rising on low hills. The level further falls to 2453 at Eshkashim, where the road meets with the end of road under Tajikistan Border Bridge. Due to altitude variation, it is accompanied by some differences in Beharak and Eshkashim temperatures and precipitations. The yearly number of frosted days in Beharak and Eshkashim varies accordingly. Considering the frosted days construction planning shall be adopted. The temperatures in the project area vary from -10 $^{\circ}$ C to +35 $^{\circ}$ C.The road design considered sound engineering practices, such as contraction and expansion joints, air entrainments, so that it will function steadily during the warmest and coldest temperature of the year.

The project is administratively located within the province of Badakhshan. The geological features along the alignment of this project road are dominated by quaternary sediments but having some sedimentary deposits near Eshkashim.

Terrain: The alignments mostly cross through hilly terrain. It crosses flat land in the valleys of river of streams. About 11.82% of the Project road passes through mountainous terrain, 6.76% passes through rock to mountainous terrain, 69.53% passes through rolling terrain and 11.90% passes through flat terrain. The flat agricultural lands in the route, through which the alignments run, make only 35% of the total area of the route.

Noise: The present noise in the entire alignment is motor vehicles running to Eshkashim. Noise level observed during reconnaissance could not identify any source of high sound and hence no monitoring was undertaken as part of this IEE. Road noise from the traffic is the major noise source during the day which is significantly reduced at night. During the construction phase there will be significant increase in movement of construction vehicles. The contractor will be required to liaise regularly with the community and in the event that there are night time noise impacts the contractor will be required to limit construction to the hours of 7am to 7pm.

Air: The air pollution takes place from dust blowing after running of vehicles in the gravel road. The exhaust emission is from vehicles running on rugged road scaling high grade. At the end of the alignment trucks emit exhaust gas while running on rugged road. But the pollution level is negligible as the numbers of vehicles are few. Dust mask will be provided to the workers engaged at dust generation points like excavations and loading points and stone crusher area. Use of proper mitigation measures will be adopted like wet drilling, water sprinkling on haul roads, proper maintenance of vehicles, green area development along the road sides and along the camp boundary to minimize air pollution & periodic Air Quality Monitoring.

Water: The quantity of water available in the Proposed Project for construction activity is greater than that in many other areas of Afghanistan. Two major rivers viz Warduj (Wakhan) River and Wijing River traverse through the project influence area up to Necham. The alignments sometimes follow the rivers while they cross it at some locations. The rivers are not rich in aquatic resources. The road alignment follows valleys with small running streams in the reach at different locations. It crosses one major channel at KM 32+219 and the Warduj River at KM 53+750, which drain large catchments.

Groundwater Resource: Groundwater is available in the valleys and used by the people for domestic use. Local people use the water using hand pumps. Local people did not raise any problem during pubic consultation in respect of water.

Ecological Environment: Flora: The vegetation along the corridor of the project area is primarily semi-arid, which mainly consists of barren land with resistant grasses and various shrubs. Trees occur mainly in valleys where there is water. The number of such common species varies between Kikar, White Poplar, Black Poplar, Toot, Bed, Pines, Chahr Maghz, Walnut, Maple, Senjid etc. Villages are located almost half of the entire alignment in the valleys, where farming land also exist. Crops grown are wheat, barley, corn, potato, vegetables and fruits. Mainly apple, apricots, peach and pomegranate trees are grown in the project influence area with a negligible few plots of vine. However, the project area has no special species to be considered for preservation. Periodic cleaning, manuring and watering will be done for healthy growth of existing trees with proper fencing and guarding of trees. Plantation area will be fenced to protect from cattle menace.

Fauna: The project road area is in non-forest land where presence of fauna is very rare. Fauna were identified in the area of influence through discussion with knowledgeable persons and through observation. Among the fauna of the area large vertebrates such as Turanian Tiger and Cheetah have been totally eradicated. Mountain deer are learnt to occur in the valleys of hills and occasionally found. Many game birds such as pheasant, partridge and large predators like eagles, falcons, and vultures have diminished. In addition, desert lizard and snake are also declining. Among the common animals there exist wolves, foxes, hedgehog, polecat, hare and rodents such as squirrels, rats and mouse. No endangered species of fauna is found in and around alignment. As such, there will be no adverse impact of the construction activity on fauna found in the study area.

SOCIO-ECONOMIC ENVIRONMENT

Almost all (96%) of the population of Badakhshan lives in rural districts while 4% lives in urban areas. Badakhshan province also has a population of Kuchis or Nomads whose numbers vary in different seasons and move from one place to the other to graze their animals and to seek agricultural jobs. The population is mostly illiterate and skilled manpower is limited. Agriculture is main backbone of income of the population along the road. The road infrastructure is poor for which schools and other institutes like health centres are not well connected. Power supply is hardly available. There is no industry along the project road.

Afghanistan's national income, is one of the lowest in the world at 772\$ per capita. The economy of Afghanistan, home to about 27.5 million people, has been ravaged by 25 years of war which ended with the ouster of the hardliner Taliban Regime in late 2001 since then the economy is growing steadily "The growth rate of economy in 2006 was 14 percent and last year growth rate was 9.5%."

The overall impact on the socio economic environment will be positive as the deployed laborers will be from nearby villages and these people are mainly dependent upon agricultural activities because they are not skilled in any other trade and vocation. This project will lead to a better social and economic life of the nearby villagers.

Environmental Impacts and Mitigation Measures: The project does neither pass through any protected or ecologically sensitive area nor there any such area in its close vicinity. Although,

the construction works are expected to be challenging which include blasting of rocks, management of landslides, compaction of filled in materials etc. But the design and planning takes care potential environmental impacts and almost all the environmental impacts are expected to be managed by engineering solution by incorporating the mitigation measures as part of the civil works. Hence, the project would not generate long-term significant environmental impacts due to its location. The environmental impacts associated with the construction stage will mostly caused by land clearing, establishment of embankment and laying of the road surface. The impacts will include (i) disruption of traffic in the construction area (ii) increased air pollution due to increasing dust from running construction vehicles and equipment, release of volatile chemical substances from the asphalt/bitumen plant (iii) noise and vibration, (iv) temporary increase in sediment load for construction of hydraulic structures (v) temporary increase in sediment load for construction of hydraulic structures (vi) potential landslides associated with elevating some part of the road through cuts and fills (vii) cutting of trees along the road in the habitation area and valleys.

Mitigation measures to minimise these impacts include (i) rerouting of traffic with clear signs; (ii) maintaining optimum moisture content during soil compaction and spraying water to minimize dust (iii) maintaining a safe distance between the asphalt plant and habitation area and public facilities including education facilities; (iv) strictly controlling construction works that create noise and vibration by prohibiting night work in residential areas; (v) locating the hot-mix and crusher plants at least 1 km from residential areas; (vi) Arranging removal of stagnant water and providing adequate drainage system (vii) stabilising road embankment side slopes and (viii) planting of trees in the berm of the road to overcome the loss in abundance enhance environment; social mobilization for plantation of trees. These measures will be included in the contract document for the civil works.

The impacts of rock blasting are creation of noise and vibration and displacement of rocks and spreading in adjacent area and at times rolling down hills. The blasting areas are not very close to human habitation. However, the following mitigation measures will be undertaken to avoid adverse impact.

- (i) The explosives will stored in safe magazine away from habitation area;
- (ii) The entry of explosives and dispatch to worksite will be properly recorded and monitored according to predesigned schedule;
- (iii) Prior to undertaking any blasting an assessment of the area will be carried out to identify if there is any habitation likely to be affected;
- (iv) Evacuate the population living in the risk zone and pay compensation for relocation and loss of work time;
- (v) Undertake "controlled blasting" so that earth and rock-wastes from blasting could be controlled and eventually disposed at an environmentally safe location;
- (vi) The contractor will be under obligation of submit a plan identifying where the blasted waste (rock and earth) will be disposed. The area should not be located nearby any water body, agriculture land, and down slope of the road that will trigger unstable slopes; and
- (vii) Blasting will be carried out if other less invasive methods could not be used

Camps for construction workers will be established in areas that are not prone to social conflicts. The camps will be provided with safe drinking water supply, adequate sanitation facilities and waste management facilities to avoid disturbance to the community. Construction materials that contain hazardous and toxic substances such as petroleum, asphalt and

detonators should be stored in proper places and managed in accordance with the relevant manufacturer's instruction and applicable international standards.

The environmental impact associated with the operation of the project is mainly on traffic safety; therefore, adequate traffic signs and physical barriers to reduce motorist speed must be provided. Motivational work is to be carried out on drivers to observe safe driving. The speed limit in villages and towns along the road corridor, particularly where schools, markets and commercial activities usually take place should be low conforming to the safety of people walking on the road.

INSTITUTIONAL REQUIREMENT AND ENVIRONMENTAL MONITORING PLAN

Institutional Framework and Responsibility: Implementation of mitigation measures during construction will be the responsibility of the contractor. An Environment Specialist, who will be hired as part of the supervision consultant team to implement the project, will help the Ministry of Public Work (MPW), in particularly the Project Management Unit (PMU) is responsible for preparing contractual documentation, so that the bidding documents, and other contractual obligations of the contractor clearly identify environmental responsibilities and describe penalties for non-compliance.

Environmental Management Plan (EMP): The IEE report has incorporated the framework for the environmental management plan, which will be adopted to monitor and mitigate any adverse impacts during the implementation of the project. The EMP is attached as Main Report in the IEE report

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Informal public consultation was conducted during the IEE study with the population living along the road project. For the alignment of road close to Beharak, consultations were carried out at several places with the village representatives from about 15 villages. The community along this road project did not show any objection to the proposed road development. However, the community leaders of different villages in Chakaran, Warduj areas had requested to bypass road alignment to avoid the irrigation channels. Hence, the road alignment has been proposed some by passes at irrigation channels where feasible.

Similarly, for the section of road from Zebak to Eshkashim, the consultation was carried out with the village representatives and villagers from about 11 villages. The communities along this road project also did not show any objection to the proposed road development.

The finding of consultations did not have any particular concerns about any potential impacts associated with the project. However, MPW should continue consult with community living along the route particularly prior to the start of the construction, so that location for the asphalt plant, storage materials and disposing spoiled materials could be located with less inconvenience for the community.

FINDINGS AND RECOMMENDATIONS

The IEE study indicates that environmental impacts associate with this proposed project may mostly occur during the construction period and that practical measures are available to mitigate and manage any adverse impacts. Hence, a detailed environmental impact assessment to assess further any impacts associated with this project is not required. In the operation phase there will be significant increase in traffic and exhaust emission in the area along the road is likely to increase. But this can easily be mitigated if vehicles properly certified are allowed to operate on the road.

CONCLUSION

The feasibility study had earlier been carried by Louis Berger Group (LBG) and environmental management requirement meeting environmental condition studied. This report is, mainly, prepared to assess the need of the reviewing and updating the environmental study. The project is designated as environmental Category "B" which is appropriate and consistent with the provisions of Safeguards Policy Statement (SPS) 2009, as the project objectives and the project has not any significant or irreversible environmental impact from the rehabilitation/reconstruction of the regional infrastructures.

The project will improve the existing road network in Afghanistan. The overall IEE finding is that the project will not cause significant environmental problems and potential adverse impacts are manageable. However, a detailed monitoring plan needs to be prepared during the engineering design and continued environmental monitoring should be carried out. The EMP should be included as part of contract document for project implementation. In addition, any changes to the road alignment will be reported to ADB and necessary environmental impact study will be carried to justify the changes in the alignment from environmental impact point of view. Annual report on implementing environmental management plan will be prepared as part of overall project, implementation report will be submitted to ADB, NEPA and other relevant government agencies.

CHAPTER-1 INTRODUCTION

1.1 Introduction:

1. This Initial Environmental Examination (IEE) has been prepared as part of the Government of Afghanistan's (GoA) commitment to preserve congenial environment of the area through which Beharak–Warduj–Zebak–Eshkashim Road passes. This road, a part of the Transport Network Development Investment Program, Tranche-4 (TNDIP T4) Project, will make the shortest trading transit route to connect countries such as Tajikistan, Uzbekistan, Turkmenistan, Kazakhstan, China and Pakistan through Afghanistan. The proponent of this project is the Ministry of Public Works (MPW). The TNDIP T4 Project is a large development project which emanated from decisions made on road network policies and implementation of strategies within the national administrative structures of government. The objective of the project is to provide transport facilities to hinterlands of Badakhshan province, in order to improve the economy and welfare of the area. As such, the Project will foster production and trade of major farm products and increased use of transport services in the project area, regional and international trade and sustainable economic growth.

2. With the assistance of consultants and the ADB, MPW prepared this Initial Environmental Examination (IEE) of this Project on the basis of field investigations, stakeholder consultation, primary and secondary data analyses and review of other road project reports in Afghanistan and other central Asian countries. The IEE covers the general environmental profile of the Project area and includes an overview of the potential environmental impacts and their magnitude. The IEE considered environmental impacts on physical, ecological, social and cultural environment of project influence area. The IEE was prepared following the requirements of the National Environment Protection Agency (NEPA) of Afghanistan.

3. The environmental policy of the Afghanistan governed by the National Environment Protection Agency (NEPA) requires Initial Environmental Examination (IEE) for all projects and Environmental Impact Assessment (EIA) for only the red listed projects. The IEE study has, therefore, been carried out to identify, if the project activities would adversely affect project influence area environment and suggest measures how to avoid it. In case some affects cannot be avoided then mitigation measures have been suggested. Even it went at length to suggest steps needed to enhance the ambient condition without involving very much extraneous activities.

1.2.1 ADB Environmental Requirements:

4. ADB the donor gives stress on safeguarding the environmental condition of the area of a project financed by it. It has accordingly developed guidelines to be followed in projects financed by it. According to the ADB, the environmental assessment requirements for projects depend on the significance of environmental impacts. Each proposed project is scrutinized as to its type, location, the sensitivity, scale, nature and magnitude of its potential environmental impacts; and availability of cost-effective mitigation measures. Projects thus screened for their expected environmental impact are assigned to one of the following four categories.

i. Category A: Projects are categorized as "A" if they would have significant adverse environmental impacts. Thus, an EIA is required to address significant impacts.

- ii. Category B: Projects are categorized as "B" if they would have some adverse environmental impacts, but of lesser degree or significance than those of category "A" projects. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- iii. Category C: Projects are categorized as "C" if they are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.
- iv. Category FI: Projects are classified as category "FI" if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

According to ADB guidelines road project are under category "B" for Environmental 5. Assessment and the Rapid Environmental Assessment (Annexure 1) was applied to pre-classify the project, therefore the project under examination requires an IEE only. For Category 'B' projects, the IEE is reviewed by the executing agency. The feasibility study had earlier been carried by Louis Berger Group (LBG) and environmental management requirement meeting environmental condition studied. This report is, mainly, prepared to assess the need of the reviewing and updating the environmental study. The project is designated as environmental Category "B" which is appropriate and consistent with the provisions of Safeguards Policy Statement (SPS) 2009, as the project objectives and the project has not any significant or irreversible environmental impact from the rehabilitation/reconstruction of the regional infrastructures. Depending on the scope of public consultation activities, additional comments may be sought from the project affected people and other stakeholders. All comments are to be incorporated into the final documents. MPW and NEPA will make a final review of the IEE report. This IEE is structured in accordance with the requirements of the Asian Development Bank's (ADB) Safeguards Policy Statement (SPS), 2009. The Project involves reconstruction and rehabilitation of roads, bridges and other drainage structures, protection of landslide, rock fall and side-slopes. The study has looked into probable negative and positive environmental impacts.

1.3 **Objectives of the Study:**

6. Initial Environmental Examination of the road has three basic objectives, as stated below:

- i. To determine the magnitude of potential environmental concerns and to ensure that environmental considerations are given adequate weight age in carrying out the proposed road improvements.
- ii. To recommend environmental considerations to be taken into account for selection of road network links that should be improved, taking into account both adverse and beneficial environmental impacts
- iii. To classify the type of environmental assessment required, if any.

1.4 Scope of the Study:

7. To fulfil the requirement for category B projects, this IEE has been undertaken so that the project is planned and designed in keeping with the policy of the government as well as the donor agency. Further guidelines are to be set to ensure that the contractors comply with the environmental requirements during the construction period, with the aim of making the project environmentally sound. As such the scope of this environmental study is as follows:

- i. To identify the baseline environmental condition;
- ii. To assess the potential environmental impacts of the construction/re-construction works of the road;
- iii. To identify mitigation measures to minimize the impact;
- iv. To prepare a brief Environmental Management Plan including Environmental Monitoring Plan for the project; and
- v. To assess if the work is planned and designed in accordance with the laws, regulations and guidelines of the government.

1.5 Executing Agency:

8. The executing agency of the proposed project is Ministry of Public Works (MPW). The work related to Initial Environmental and Feasibility study had been assigned to the **BETS** Consultant Services Ltd. JV with SARM associates Bangladesh in association with SMART Engineering Team Ltd. Afghanistan.

1.6 Methodology:

9. Beharak to Eshkashim Road Project is a component of TNDIP T4 Project. The IEE report of this subproject is prepared in conformity with the Afghan Rules and Regulations. The report is also based on the primary and secondary data and information collected through field investigation and data obtained from project authority. The activities carried out include the following:

- i. Activity 1: In house discussion with consultants of different disciplines with a view having a clear idea of the route and components of the work.
- Activity 2: Collection and Review of Relevant Documents: The environmental team collected and reviewed project parameters, primary and secondary data including technical information and design specification provided by engineering team.
- iii. Activity 3: Reconnaissance: The first hand information and physical review were carried in two steps. Reconnaissance of all the options was done through field visits from base camp at Faizabad. Information and data in respect of the alignment up to Eshkashim was done from the base camp.
- iv. Activity 4: Field Investigation: Based on reconnaissance important issues and parameters to be investigated were identified and checklists were prepared. In subsequent visits by the Environmentalist and Environmental Investigators, various data were collected using simple tools like checklist, questionnaire, discussion with local people etc. In the process data on habitations, wetlands and places of importance in the vicinity of the alignment and in the surrounding area

were identified. A stock of ecological situation prevailing in the area was also taken as is depicted in two of many pictures taken. (Pictures 1 and 2).

v. Activity 5: Public Consultation: Public consultations were carried out during field survey to obtain the views of local people, project affected persons and local administrative representatives.



10. Based on collected data and information, potential adverse environmental impacts have been identified and examined using ADB's Rapid Environmental Assessment (REA) Checklist.

11. Thereafter possible mitigation measures have been spelled out and on the basis of findings of impact appraisal comprising the key elements embodied in this IEE, an Environmental Monitoring and Management Plan (EMMP) has been developed. Discussions were undertaken with the executive agency and technical team of the consultant for integrating environmental management measures into the project.



Picture-1 and 2: The riverbed, habitations and places of importance in the project area.

1.7 Identification of the Important Environmental Components (IEC's):

12. Important Environmental Components are defined as the sensitive or critical locations of the study area, which need special considerations for, design, construction and operation aspects. The major objective of this study is to identify the Important Environmental Components for more detailed environmental impact assessment. Based on the environmental survey, review of existing literature, discussion with the officials and local people, the Important Environmental Environmental Components within the Project Impact Zone have been identified.

13. Information on Important Environmental Components (IEC) of the project area collected from the Beharak, Warduj, Zebak and Eshkashim area are presented below:

14. Fauna and wildlife, Fishery Resources, Crop Production, Livestock, Tree plantation, Social Impact, Health and Nutrition, Human Diseases, Noise pollution, Air pollution, Sanitation & Health including latrines/urinals, Possible accidents, Safety measures, Waste generation, Transportation etc. Loss of farm land, water stagnation, dislocation of human habitation, restriction in fish movement, social and cultural dislocation, environmental pollution, disruption in navigation, disruption in irrigation, disruption of faunal diversity (animal diversity), disruption of floral diversity, erosion and siltation, job opportunities, agro-ecosystem, forest resources, livestock and fisheries resources, water resources, public health and infrastructure and homestead information.

1.8 Preparation of the Report:

15. The Environment Specialist prepared the IEE report putting all relevant issues in sequential manner. In the process it identified if there will be any significant adverse environmental impacts in the area by the project during different stages of implementation and subsequent operation. Possible need for land acquisition and consequent resettlement have been assessed to ensure that the project affected persons are at least as well off as prior to the acquisition. Relevant issues have been included in the study and incorporated in the report. The report has been divided into several chapters to specifically attend to relevant and closely associated issues.

1.9 Structure of the Report

16. The report has been structured in compliance with the requirement of Terms of Reference.

Chapter-1: Introduction

The Chapter of introduction deals with a brief overview of the assignment along with its background, objectives, scope of works, methodology, etc.

Chapter-2: Policy and Legislation

Chapter 2 deals with the Policy and Legislation on the environmental issues.

Chapter-3: Project Description

Chapter 3 deals with the project description including the project background, project category, need of the project, location, size and magnitude of operation.

Chapter-4: Description of Environmental Baseline

Chapter 4 deals with the description of environmental baseline (Socioeconomic, physical and biological) of the project area.

Chapter-5: Screening of Potential Environmental Impacts and Mitigation Measures

This Chapter deals the Environmental Impacts of the proposed project and possible Mitigation measures.

Chapter-6: Institutional Requirement and Environmental Monitoring Program

The Chapter mainly deals with the monitoring program of the project

Chapter-7: Public Consultations

Opinions of the local people have been discussed in this chapter

Chapter-8: Environmental Management Plan

This chapter deals with Roles and Responsibilities of Functionaries

Chapter-9: Finding Recommendation and Conclusion

This chapter gives the Finding, Conclusion and Recommendation of the project.

CHAPTER-2 LEGAL AND ADMINISTRATIVE FRAMEWORK

17. The preservation of congenial environment of Afghanistan is ensured by the Environmental Act which came in effect January 2006 through an official gazette (Issue No: 873, 19th January 2006).

2.1 Afghanistan Environment Act

18. The Environment Act was promulgated to be effective on Article 15 of the Constitution of Afghanistan and provide for the management of issues related to rehabilitation of the environment and the conservation and sustainable use of natural resources and living and non-living organisms. The Environment Act consists of 82 articles written in nine chapters. The prime purposes of this act are:

- i. Improving livelihood and protect the health of humans, flora and fauna
- ii. Maintaining ecological functions and evolutionary processes
- iii. Securing the needs and interests of present and future generations
- iv. Conserving natural and cultural heritage
- v. Facilitating the reconstruction and sustainable development of the national economy.

19. Chapter 2 of the Act is about the functions and powers of the National Environmental Protection Agency (NEPA). Article 22 is related to EIA Board of Experts and the following points are mentioned in it.

- i. The National Environmental Protection Agency shall appoint an EIA Board of Experts to review, assess and consider applications and documents submitted by proponents for obtaining permits and make technical recommendations in regard to whether to issue permits, as well as the conditions that should be attached to any permit that is granted.
- ii. The EIA Board of Experts shall be composed of not more than eight competent and technically qualified members.
- iii. The Director General of the National Environmental Protection Agency may appoint, on an application-by-application basis, not more than four additional competent and technically qualified temporary members.

2.2 EIA Policy Document

20. The EIA policy document was drafted on 12 February 2006 and approved by the National Assembly of Afghanistan through Gazette No. 912, dated 25 January 2007. The purpose of this document is to take the first step in developing a formal EIA procedure in Afghanistan. This procedure will form the basis of an administrative process which can be adopted by the Government of the Islamic Republic of Afghanistan.

21. The EIA policy vision of Afghanistan is as follows:

22. The vision will be implemented by (i) developing a sound capacity within the government so that it is able to develop and implement the EIA; (ii) ensuring the work of donor organizations to enhance the government capacity to understand the EIA principles and processes; (iii)

encouraging proponents to work closely with the government on proposed projects with potentially "significant adverse impacts".

23. The policy approach will be to develop a limited EIA system that NEPA can implement in line with its existing capacity and future development. It must be recognized that UNEP is a key partner for NEPA and will support the development of capacity around this approach. This policy will develop a staged approach that supports the provisions of the promulgated Environment Act.

24. Additionally, all line Ministries of the government and the private sector will be supported by capacity development activities to ensure their capability to comply with legal requirements is enhanced.

25. The key points of the EIA policy are as follows:

- i. The EIA process administered by NEPA will be an abbreviated system, focused on screening, scoping, reporting, decision making and approval.
- ii. It will require proponents to adhere to screening and scoping provisions prior to work commencement.
- iii. NEPA will make a decision on the level of assessment and scope of an EIA report through assistance from the EIA Board of Experts.
- iv. NEPA will release a conditional approval for the commencement of works within a designated time period following the receipt of sufficient information to allow for a decision on the level of assessment and scope of EIA.
- v. The conditional approval does not require proponents to submit a full EIA report to the project works which have commenced.
- vi. For certain projects subject to an EIA, a pollution control permit may also be required as stipulated in the regulations.
- vii. The conditional approval of a proposed project will require all prepared reports to be submitted and lodged with NEPA with a completed environmental management plan.
- viii. On submission of an EIA report to the satisfaction of the NEPA, the proponent will be provided with a permit of compliance.
- ix. Proponents will be required to report to NEPA the implementation of the Project Environmental Management Plan.
- x. NEPA will monitor, if necessary, the implementation of any environmental management plan and direct proponents, if and as required, to improve the plan. This policy document presents the environmental problems and institutional settings, including lack of relevant regulations, standards and data as well as weak institutions and their unclear mandates. In this respect however, this policy paper recognizes the following important points:
- xi. An Environment Act (EA) for Afghanistan which provides a framework for the development of this policy and the relevant stages of EIA.
- xii. The establishment of an independent National Environmental Protection Agency in Afghanistan. Even though this organization is still in a nascent stage it will develop over time and this policy recognizes that this organization has sole responsibility for the implementation and management of EIA processes in Afghanistan.

2.3 Administrative Process for the EIA

- 26. Article 15 of the Environment Act is about prohibited activities which entail the following:
 - i. No person may undertake an activity or implement a project, plan or policy that is likely to have a significant adverse impact on the environment unless the provisions of Article 18 have been complied with.
 - ii. No ministry or national authority may grant an authorization for the execution of an activity or implementation of a project, plan or policy that is likely to have a significant adverse effect on the environment unless the provisions of Article 18 of this Act have been complied with. This requires the proponent to apply to NEPA for a permit to undertake the activity under Article 18.
 - iii. If the NEPA, acting on the advice of the EIA Board of Experts, considers that all the environmental impacts and concerns are adequately addressed by the environmental impact statement, the final record of opinion or the comprehensive mitigation plan, it shall grant a permit for the project, plan, policy or activity subject to whatever terms and conditions the National Environmental Protection Agency, acting on the advice of the EIA Boards of Expert, considers appropriate to ensure that the significant adverse effects of the project, plan, policy or activity are effectively avoided, mitigated and remedied.
 - iv. The NEPA shall refuse to grant a permit in respect of a project, plan, policy or activity if the National Environmental Protection Agency, acting on the advice of the EIA Board of Experts, considers that the implementation of the project would bring about unacceptable significant adverse effects or that the mitigation measures may be inadequate to satisfactorily mitigate the significant adverse effects of the proposed project, plan, policy or activity, provided the National Environmental Protection Agency presents written reasons for the refusal.
 - v. The NEPA may withdraw a permit granted if the proponent fails to comply with any of the terms and conditions to which the permit is subject.
 - vi. A permit will lapse in the event that the proponent fails to undertake the activity or implement the project, plan or policy for which the permit was granted within three years, MPW of the date at which the permit was granted.

27. NEPA has a process to identify whether a project needs an EIA study or not. This initial stage process is called screening the project.

28. NEPA has classified the projects in Afghanistan into three categories defined as follows:

29. **Category (1):** A project is classified as a Category (1) if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented, and affect an area broader than the sites or facilities subject to physical work.

30. **Category (2):** A project is classified as Category (2) if its potential adverse environmental impacts on human populations or environmentally sensitive areas (e.g. wetlands, forests, grasslands and other natural habitats) are less adverse than those of Category (1) projects. These impacts are site specific and few are irreversible.

31. **Category (3):** A project is classified as Category (3) if it is likely to have minimal or no adverse environmental impacts.

32. According to the guidelines of NEPA, Beharak–Eshkashim Road Project falls under Category (2), i.e. it is not likely to have significant adverse impacts since the project is aimed at developing the existing road which will facilitate re-construction of 108 km of road.

2.4 Other Relevant Laws of Afghanistan:

33. The following are the relevant laws which are available in the Department of Law in the Ministry of Justice:

- i. Water Law, 1981
- ii. The Forestry Law of Islamic Emirate of Afghanistan, 2000
- iii. The Islamic Emirate of Afghanistan Law for Land Ownership, 2000
- iv. Nature Protection Law, 1986/2000
- v. Agricultural Quarantine Services Law, 2000
- vi. Veterinary Services Law, 2000
- vii. Hunting and Wildlife Protection Law, 2000
- viii. Range Management Law, 1970 / 2000
- ix. Agriculture Cooperative Development Law, 2000
- x. Charter for Department of Fertilizer and Agro-Chemicals, 2000
- xi. Seed Improvement Department Charter, 2000
- xii. Mines Law of Islamic Republic of Afghanistan, 2006

2.5 International Treaties: Afghanistan is a signatory of many international environmental agreements and treaties. The treaties relevant to the proposed development are given below:

- i. The Convention on Biological Diversity is an international treaty that was adopted at the Earth Summit in Rio de Janeiro in 1992. The Convention has three main goals:
 - Conservation of biological diversity (biodiversity);
 - Sustainable use of its components;
 - Fair and equitable sharing of benefits arising from genetic resources.
- ii. The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro in 1992. The treaty aimed at reducing emissions of greenhouse gas in order to combat global warming.
- iii. The United Nations Convention to Combat Desertification came into force, on 26 December 1996. The Convention was as much about rural development, agricultural growth, and poverty alleviation, as it was about combating desertification.
- iv. CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Afghanistan became a member of treaty in 1986.

2.6 Conformity of the Project with Laws of the Country and Relevant Guidelines

34. In carrying out the study the environmental guidelines of ADB, the donor has been properly addressed. The study initially identified the probable environmental indicators and assessed the probable impacts by using the ADB's Rapid Environmental Assessment (REA) Checklist enclosed as Annexure 1.

- i. It reveals that the project road does not pass through any environmentally sensitive area
- ii. The project does not encroach upon precious ecology and historical cultural areas
- iii. The project does not involve alteration of surface water hydrology
- iv. Short duration and minor siltation is anticipated during construction of bridges and culverts but considerable deterioration of water quality and morphology is not anticipated
- v. The project involves limited dislocation or involuntary resettlement of people and
- vi. Most of the anticipated potential adverse impacts will be limited in spatial and temporal extent, i.e., short-term during construction and possible to mitigate.

35. So, according to ADB Safeguards Policy Statement of 2009, Appendix 1: Safeguard Requirements 1: Environment, the proposed Beharak to Eshkashim Road Project is not deemed environmentally sensitive classified and been treated as a Category "B" project.

36. As per the criteria of NEPA of Afghanistan the Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of \$800,000 and above and widening of existing roads falls under Category 1 and the same may require an Environmental Impact Assessment (EIA). But the road project under study mainly endeavours to rebuild an existing road and it is not likely to have any significant adverse impacts as will be revealed from the successive chapters; rather this will have enormous positive benefits and hence it does not require an EIA. As such, an Initial Environmental Examination (IEE) has been carried out since no significant adverse impacts have been envisaged.

37. It will not contravene any law of the country, especially related with environment. It will not destroy or harm forests, no threatened or endangered species will be destroyed, some abundance of some species may be reduced for short period but will be more than replenished to increase the abundance, the workers and staff will not be permitted to hunt, no agricultural product will be allowed to enter the country without passing through the quarantine process and the Ministry of Mines will be consulted in extraction of minerals and construction materials from natural sources.

38. The project will be implemented in conformity with international treaties and conventions to which the republic is committed to comply with. The project will reduce gaseous emission rate from vehicle per kilometer according to UNFCCC, it will not help in the desertification, it will not take any step to affect the biodiversity, it will not encourage poaching of wild fauna and it will not allow trading on endangered species.

39. So the IEE has been carried out in keeping with the requirement of the government and the donor agency.

CHAPTER-3 DESCRIPTION OF THE PROJECT

3.1 Location of the Project:

40. Beharak to Eshkashim Road Project is a component of TNDIPT-4 Project having starting point at the Head Quarter of Beharak District of Badakhshan Province and the ending point is at Eshkashim of also Badakhshan Province of Afghanistan. This project is continuation of Faizabad- Beharak Road (NH-43) and traverses north - East direction and ends at Eshkashim Border Bridge connecting Tajikistan at km 107+996. It is located in the north east of Afghanistan. The road location in the transport network of the country is shown in Figure 3-1.





3.2 Environmental Category of the Project

41. The project is according to ADB guideline a B category as has been describe in the previous chapter.

3.3 Benefit from the Project:

42. Beharak to Eshkashim Road Project is expected to bring the following benefits to the people living in the Project Area:

- i. Will improve road communication for an un-served area
- ii. Will improve transportation facility from within and through the project area
- iii. Decrease transportation cost as the transportation cost on bad roads is high
- iv. Will decrease rate of air pollution, which is high in unpaved gravel or earthen road
- v. Will help increment in household income through employment in road construction, O&M activity and transportation activity
- vi. Substantial increase in cash flow particularly for poor groups
- vii. Will enhance education facilities
- viii. Will improve marketing of local products and increase trade facilities
- ix. Will support medical and hygiene services
- x. Will increase social community development and many more.

3.4 Components of Works:

43. The Rehabilitation and Reconstruction of Beharak to Eshkashim Road Project include components like preparation of the base of the road, paving of the road surface, construction cross drainage structures, protection measures, rehabilitation of PAPs and environmental management etc.

3.5 Size and Magnitude of Operation:

3.5.1 Basic Data:

44. The basic data of the project are furnished in Table-3.1.

| 1. | Name of the Project | ••• | Beharak to Eshkashim Road Project. |
|-----|-----------------------------|-----|--|
| 2. | Project Executor | : | Ministry of Public Works. |
| 3. | Funding Agency | | Asian Development Bank |
| 4. | Name of the Consultant | ••• | BETS Consultant Services Ltd. JV with SARM associates Bangladesh in association with SMART Engineering Team Ltd. Afghanistan |
| 5. | 5. Project Location | | Beharak to Eshkashim Road Project is a component of TNDIP T4 Project with starting point at Beharak city (3km) and end point at Eshkashim Border Bridge of Badakhshan Province of Afghanistan. |
| 6. | Final Product | : | 108 km of Road |
| 7. | Current Traffic pressure | • | Medium low |
| 8. | Length of the Road | • • | 108 km. |
| 9. | Width of the Road | : | 11m (7m=Carriage way+ 2+2 m= hard shoulder) |
| 10. | Project Cost | : | About \$ 150 Million |

Table 3-1: Basic Data of the Project

| 1. | Name of the Project | : | Beharak to Eshkashim Road Project. |
|-----|-----------------------|-----|---------------------------------------|
| 11. | Physical Construction | : | From Mid 2015- 2018 |
| 12. | Land Acquisition | : | 124 Ha. (Source: Resettlement Expert) |
| 13. | Land Requisition | • • | Nil |

Source: Team Leader of the Project.

3.5.2 Components of Work

- 45. Major components of works are:
 - i. Survey and route fixing
 - ii. Earth filling (embankment) to raise the road alignment up and cutting of rock.
 - iii. Carrying materials to the site
 - iv. Storage of materials and equipment
 - v. Construction of the road, stoppage points etc.
 - vi. Construction of adequate drainage and culverts along the right-of-way for smooth passes of rain and irrigation water, and of local livestock

3.5.2.1 Survey and Route Fixing:

46. This would include topographical and hydrological, geotechnical etc. survey along the routes under different options.

3.5.2.2 Earth Filling and Cutting of Rock for Preparation of Base

47. Earth for construction of the road alignment and culverts is learnt to be borrowed from adjacent barren land by dredging equipment. The spreading of the fill materials is to be made in layers conforming to standard engineering practices, so that appropriate compaction is attained. Earth filling will be done mechanically. Compaction will be made with the uses of vibrating heavy rollers suitable for the type of soil used for the roadwork. The soil should be brought to optimum moisture content to give the desired level of compaction (i.e. 85% compaction). This will also prevent harmful dust pollution.

48. The road alignment will also require cutting of rock for setting the base of the alignment. The debris will be used for filling side of the embankment.

3.5.2.3 Carrying Materials to the Site

49. Materials to be used will include fill materials (sandy soil), bricks, sand, stone chips, cement, bitumen, steel, iron rode, drainage pipes, etc. These are likely to be carried by trucks and stored locally at designated places and intermediate locations. Fill materials will be transported to the site by the trucks will be taken from the designated barren areas.

3.5.2.4 Storage of Materials

50. At the time that the feasibility study was undertaken, decisions had not yet been taken with regard to the location of secondary project infrastructure and components such as access roads, construction camp sites, borrow pits, and spoil dumps. The results of the feasibility studies will in fact guide these choices. However, materials can be stored at the proposed starting point of at Beharak, beside the existing motor way at different locations and end point of

at Eshkashim. The storage will be temporarily used for a short duration, and will be cleared after immediate completion of construction of the road alignment.

| No. | Village | Location of | Comments | |
|-----|-------------|-------------|---|--|
| | _ | Camp Site | | |
| 1 | Warduj | KM 20+000 | Close to water facility and access to Warduj | |
| | - | | Bazar. New bridge and causeways are to be | |
| | | | constructed nearby this area | |
| 2 | Sufian | KM 32+500 | Close to water facility and access to Bazar. New | |
| | | | bridge 102 m is to be constructed in this area | |
| 3 | Safed Dara/ | KM 53+500 | Ideal site with access to water and market. 5 new | |
| | Qasdae | | bridges including 107m are to be constructed in | |
| | | | this area (Security issue should be considered) | |
| 4 | Dus-Khana | KM 75+000 | Access to water and Zebak market | |
| 5 | Eshkashim | KM 100+000 | Access to water and market | |

 Table 3-2: Plausible Location of Construction Camps along the Project

3.5.2.5 Construction of the road alignment, stoppages etc.

51. The construction works of the road and associated structures etc. will be done as per specification and standard with environment friendly equipments.

3.5.2.6 Clearing of ROW

52. After completion of the work the RoW will be cleared of all materials and debris. Road marker posts, Km posts, aerial markers, intermediate aerial markers, warning signs and proper road signs, etc. shall be installed as per specification and recommendations.

3.6.3 Alignment Design and Crest:

53. The crest of road has been designed to cater the need of the project period. The drawings and specification have been prepared according to good engineering practice. The improvement and reconstruction of the road aims to achieve the AASHTO design standard by using the software MX Road XM V8i and follow typical cross section appropriate for the terrain it passes through viz flat, rolling and mountainous terrain. The road crest will be generally 11 m wide. The paved carriage way will be 7 m wide for two lanes. Each of the two shoulders will be 2 m wide. The crown cross slope will be 2.5% to 3% depending on the pavement surface and the maximum super elevation will be 7%. The crest of the road is shown in the sketch below:



3.5.4 Construction Cross Drainage Structures

54. In all 358 structures will be required for river crossing or cross drainage. In all 5 bridges have been identified for the existing alignment under study. The other structures will be box culverts having different standard dimensions. Some of structures have been provided for allowing small quantity of irrigation water to flow across the road. Some channels drain the hill side slopes while some drain larger catchment. The sizes of existing culverts (100 Nos.) vary from 0.6m x 0.7 m to 5.0m x 2.5m. There are five existing bridges along the road, all of which are in poor condition will be used as diversion or bypass during construction. 3.5.5 Protection Measures against Erosion and Boulder Management;

55. Warduj River hits the bank at some places. At present protection works exist also at some locations. The reconstructed road is likely to be widened by cutting hills in a direction away from the river and the existing protection work may be sufficient, if the road is not required to expand on the river side.

56. In addition to river erosion points, where water mixed with large number of boulders flows in the spring from hills. At these places gabion walls are to be erected to prevent boulders from being strewn on the road. Neither of the exclusive part has problems of boulders.

3.5.5.1 River Erosion Control

57. River flood waters during the snow melt season threaten the stability of the road in some locations. The road embankment is likely to collapse in the near future at km 64+780, 66+450, 71+300, 82+300 and 83+100; it is therefore deemed urgent to carry out the proposed river bank stabilization works. A combination of river training works is proposed depending on the location including alluvial dykes protected by rip-rap, rip-rap placed on the river bank slope, or retaining walls built with gabions.

3.5.5.2 Rehabilitation of PAPs

58. The Project will require considerable land acquisition or permanent resettlement. It is estimated that total affected households 1,477 will be losing 123.9842 hectares of total land for entire length of road. Total number of affected people will be 10,531. The project affected people will be rehabilitated through proper Land Acquisition and Resettlement Plan. The summary of the land acquisition and resettlement impacts are as Table 3-4 below:

| SI. No. | LARP Components/Indicators | Result/Quantity |
|---------|--|------------------------|
| 1 | Number of Affected Households | 1,477 |
| 2 | Number of Affected Persons | 10,531 |
| 3 | Number of Affected Households Needs Relocated | 601 |
| 4 | Number of Affected Persons Needs Relocated | 4,335 |
| 5 | Area of Total Land Acquired in Hectors | 123.9842 |
| 6 | Area of Residential Land Acquired in Square Meter | 59,889 |
| 7 | Number of Affected Household of Residential Structures | 153 |

| Table 3-3: Summary | of Land Acquisition and | Resettlement Impacts |
|--------------------|-------------------------|-----------------------------|
|--------------------|-------------------------|-----------------------------|

| SI. No. | LARP Components/Indicators | Result/Quantity |
|---------|--|-----------------|
| 8 | Number of Affected Household of Commercial Structures | 448 |
| 9 | Area of Agricultural Land Acquired in Hectors | 113.3261 |
| 10 | Number of Plots Affected | 1,477 |
| 11 | Number of Residential Structures Affected | 153 |
| 12 | Number of Business Affected | 448 |
| 13 | Number of Trees Affected | 12,321 |
| 14 | Number of Affected Household That Are Poor or Vulnerable to Poverty Risk | 48 |

Source: Resettlement Specialist.

3.6 Analysis of Options:

59. Option analyses have been undertaken to ascertain the most suitable alignment from different points of view. Three options were considered. The options considered are:

Option –1: It starts from Beharak and ends at Eshkashim, having a length of 168 Km, long distance. It crosses Beharak-Jurm-Yamgan-Zebak-Eshkashim. Overhanging rock face, absurd slope 7-12% & not motor-able. So this option was not considered for further assessment.

Option –2: It starts from 4 km of Beharak town - Eshkashim Road and passes through Beharak-Madrasan-Shuhada-Eshkashim at distance of 96 km. It passes through steep hill cliffs, river bed and end on hill top and continuous. So this option was not also considered for further assessment.

Option –3: It starts from about 3 km off Beharak towards Eshkashim. It passes initially through Beharak-Warduj-Zebak-Eshkashim. This route traverses a gentle grade 1-5%, motor-able, continuous & connecting more villages. The all 3 project alternatives of the project are shown in Figure 3-2:

3.6.1 Selection of Best Alignment:

60. Improvement of road transport infrastructure is a powerful mechanism to accelerate economic growth, economic, political & moral empowerment of people with own security, governance, development of natural resources and alleviate poverty of this fringe area. Choosing of best alignment through reconnaissance of joint exploration visiting probable alignment options involving all team members of feasibility professionals from Beharak to Eshkashim for several days starting from Fayzabad at 4:00 am and coming back from Eshkashim at 11:00pm. These trips were tremendous risky, adventurous & achieving. The team members were able to decide the best option in terms of choosing of alignment through joint discussion meeting matching result of individual discussion meeting with District Governors of Beharak, Warduj, Zebak and Eshkashim through proper vetting from HE Provincial Governor of Badakhshan.

| Table | 3-4: | Analy | ysis | of | Options |
|-------|------|-------|------|----|---------|
|-------|------|-------|------|----|---------|

| Probable Alignment | Description | Length in KM | Major Characteristics | Trees/Vegetation | Justification to Chose | |
|-----------------------|---|-----------------|--|------------------------------------|---------------------------|--|
| Options –1 | Beharak-Jurm- Yamgan-Zebak- Eshkashim | 168 | Overhanging rock face, absurd slope 7–12% and not motor able | About 19,000 trees/shrubs exist | Long Distance | |
| Options –2 | Beharak-Madrasan- Shuhada- Eshkashim | 96 | Passing through steep hill cliffs, river bed and end on hill top | About 15,000 trees/shrubs exist | Not Continuous | |
| Options –3 | Beharak-Warduj- Zebak-Eshkashim | 108 | Gentle grade 1–5%, motor able, continuous and connecting more villages | About 11,600 trees/shrubs exist | Best Alignment | |

61. So, project now includes only one Option -3 as part of the project to be investigated from environmental considerations.



Figure 3-2: 3 Project Alternatives Route

CHAPTER-4 DESCRIPTION OF BASELINE INFORMATION

4.1 **Project Bounding:**

62. The primary requirement of Environmental Assessment Study of the proposed Project is to delineate the geographical boundary of the "Project area" and the "Impact area". The "Project area" is the physical location of the project while the "Impact area" encompasses the geographic extent of the significant environmental and socio-economic impacts resulting from implementation of the project. It is recognized that the benefits of the proposed project will considerably extend to the national scale. For the present IEE, the focus of the study will be limited to the area where physical impacts of the activity will be directly felt. A 1 km wide strip along both side of the road has been considered for environmental analysis. However, general socioeconomic profile is prepared for the administrative units over which the road shall traverse. Direct impact area covers the corridor through which Beharak to Eshkashim Road passes.

63. Almost all environmental parameters except topography are same. The topography through which the road travels is very important from design and cost concern of the project. The specific topographical environmental features of the alignment are described here under.

4.1.1 General Topographical and Environmental Feature of the Proposed Road

64. The alignment of the road runs through different offshoots of hill ranges of Hindu Kush Mountain. The elevation profile of the Project is given in Figure 4-1. The elevation in the project ranges from 1448 m to about 2984 m. About 11.82% of the Project road passes through mountainous terrain, 6.76% passes through rock to mountainous terrain, 69.53% passes through rolling terrain and 11.90% passes through flat terrain.





Source: Survey Team of the Project.

65. **Beharak–Warduj (KM 0+000–17+000):** This section passes through Beharak City and its suburb. There are ten villages right/left or both sides in this section. After crossing the city the first village is Arder and last one is Murkhan on the alignment. There is a moderate built-up section Pasibag at KM 5+900 to KM 7+000 along the project road. In this section other villages are Yazkhchan at KM 3+000, Poshusstan at KM 5+000 and Oshkhan at KM 7+000, Azakhcha at KM 11+000, Pasibgh at KM 13+000, Eshtakhan at KM 14+000, Wakhiani at KM 15+000, Chakaran at KM 16+000 and Warduj at KM 16+500. This section passes from the west to the East about 10 Km of length. There is rock hill at KM 2+800 and rock blasting is required for about 600m. In this section there are agricultural lands available both sides of the alignment and

irrigation channels are passing parallel and crossing some locations under poor culverts. There are some educational institutions in this section like Arder School at KM 0+800 (picture), Abdul Hannan Madrasa at KM 6+000, Ahle Mughal Girls' School at KM 8+000 and Ahle Mughal Boys' School at KM 8+500 of the alignment. Contractor may require Preparation and submission of Mobility and Access Facilitation Plan (MAFP) and Construction Schedule for uninterrupted schooling activities. Construction equipment producing excessive noise during school hours should be avoided as much as



possible. Creation a buffer zone between the school/residential areas and construction site to reduce disturbance to normal schooling/residential activities is strongly recommended.

66. In this section most of the alignment is rolling ground about 13.4 Km. common hill is 1.8 KM and there is no level ground is available.

67. **Warduj–Zebak (KM 17+000–68+500):** This section starts at Warduj Town (picture) area and passes through a rolling terrain with a good right of way. Boulders and gravel material are located all along the ROW which can be used for construction. The road alignment crosses from left bank to the wright bank of Warduj River by a bridge at KM 32+219. Subsequently, it follows the toe of hill parallel to the river valley. A major bridge is proposed to be constructed at KM 32+219 to drain a large area of hill catchment. A 12.5 m wide and 102 m long bridge is proposed to be constructed at this point.



68. In this section there are all about 2.5 km. of rock hills available. The road alignment meets rock hills at KM The road construction would require rock blasting at some sections. There will be no major impact due to rock scaling and blasting because the nearest settlements are away from the area. Here rock scaling is required at KM 66+500 to KM 69+00 for making ROW and construction of standard road. The existing alignment is again climbing to rolling to mountainous terrain. There are moderate built-up areas Sufian at KM 33+000 to KM 35+500 and Safed Dara at KM 52+000 to KM 54+500 in this section.

69. Zebak–Eshkashim (KM 69+000–108+000): Although the general topographical and environmental features are common for Warduj–Zebak section, the chainage of alignment will be different from this section. The alignment after 68 Km continues to be rolling until about 81 Km. Subsequently, it follows a mass of hard rock at 69+820 which continues up to KM 71+340. In this area rock blasting is required for about 1.52 Km. The existing alignment runs through high peak from KM 95+500 to KM 96+600 area and the designed alignment have been shifted to reduce the steepness of the road. Here the road runs down a hill into a deep valley. A 60 m high and 105m long bridge is proposed to be constructed at this point to allow easy crossing of the gully through which water of a large catchment is discharged in the spring. In this section about 8.45 km of common hill, 0.7 Km of High hill, 25.69 Km. of rolling ground and only 2.3 Km. of level ground are crossing the alignment.

70. Wijling River Basin (KM 75+000 to Km 79+000), existing track passes in the middle of the River Basin with one long vented causeway with very low embankment height, further alignment is passing along the river basin only for about 2 km. There is no tree and vegetation along the road in this reach. There are agricultural lands found in the valley bed mostly cultivating wheat. Trees and vegetations are found in the reaches of Bazgir–Kangarak (KM 95+000–KM 98+000) and Eshkashim–Sukumal (KM 103+000–KM 107+000). The following Table 4-1 is presented the location of moderate built-up sections along the Project Road.



| Chainage (km) | | Longth | Name of the town / built up | | |
|---------------|---------|---------|-----------------------------|--|--|
| From | То | Length | Name of the town / built up | | |
| 6+000 | 7+000 | 1.0 km | Pasibag | | |
| 16+000 | 22+000 | 1.0 km | Chakaran | | |
| 33+000 | 35+500 | 2.5 km | Sufian | | |
| 52+000 | 54+500 | 2.5 km | Safed Dara | | |
| 72+000 | 76+000 | 4.0 km. | Dug-Khana | | |
| 102+000 | 104+000 | 2.0 km | Eshkashim | | |

 Table 4-1: Location of Moderate Built-up Sections along the Project Road

4.1.2 Present Terrain, Gradient, and Topographic Condition of Road

71. The existing gravel pack earthen road from Beharak to Eshkashem is being improved from mule track to gravel pack earthen motor vehicle movable road for more than 50 years by district development authority funded by central government of Afghanistan. The present road condition along with terrain gradation is as Table 4-2 below:

Table 4-2: The Present Road Condition Along with Terrain Gradation

| Km. | Terrain condition | Gradation (%) | Surface condition | Camber | Side slope | Shoulder |
|-------------|--|------------------|---|----------------------|-----------------------------------|--------------------------------------|
| 0-5 | Pea-gravel & rock | 2-3 | Earthen | Flat | Steep to river bed to right | Left side only with – ve slope |
| 6-9 | Corse sand mixed with pea-gravels | 1-2 | Clay mixed with sand | Pot holes with water | Steep to hill top to left | No shoulder |
| 10-14 | Earthen mixed with gravel, semi- rolling | 3-4 | Semi rocky | Semi flat | Steep slope to both sides | Poor shoulder |
| 15-22 | Sandy silt earth | 1-2 | Earthen | poor | good | Good |
| 23-34 | Gravel mixed with pea-gravel | 2-4 | Rocky | -ve | poor | Poor |
| 35-40 | Pea-gravel mixed with coarse sand | 2-5 | Semi rocky | Good | Only right side | Only |
| 41-45 | Earthen | 1-2 | Earthen | -ve | Good | Poor |
| 46-51 | Rocky, rolling mountain | 4-5 | Semi rocky | Good | Only right side | Only right side to upward |
| 52-60 | Earthen & gravel | 1-2 | Rock mixed with pebble | poor | Only right side | Good |
| 61-65 | Rocky, rolling mountain | 4-5 | Semi rocky | Good | Only right side | Only right side to upward |
| 66-71 | Earthen mixed with gravel | 2-4 | Semi rocky | Semi flat | Steep slope to both sides | Poor shoulder |
| 72-74 | Rocky, rolling terrain | 5-7% | Semi rocky | Good | Only right side | Only right side to upward |
| 75-77 | Earthen mixed with gravel | 2-4 | Semi rocky | Semi flat | Steep slope to both sides | Poor shoulder |
| 78-81 | Sand mixed with pea-gravel, river bed | 0-0.5 | Loose sand mixed with alluvial deposit | flat | Guide wall, no side slope | Narrow shoulder both side |
| 82-84 | Pea-gravel & sandy | 1-2 | Earthen | good | Good | Poor |
| 85-87 | cause way & Concrete pavement | 05 | Concrete Gravel packed | Flat | River bed | No shoulder |
| 88-104 | Earthen mixed with gravel | 2-3 | Semi rocky mixed with coarse sand | Semi flat | gentle slope on both side | Poor shoulder |
| 105- 108 | Earthen mixed with gravel | 2-7 | Semi rocky | Semi flat | Steep slope to both sides | Poor shoulder |
72. There are 57 villages existing on both sides of road alignment from Beharak to Eshkashim via Warduj and Zebak with population is about 51,808.

4.1.3 Rock Blasting:

73. Rock blasting is required at KM 2.80 for 600m; at KM 32.30 for 540m; at KM 40.34 for 200m; and KM 67.70 for another 8600m. Acquisition, transport, storage, handling and use of explosives possess potential risk on the workers and environment. There will be no major impact due to rock scaling and blasting because the nearest settlements are more than 500m away from the rock scaling areas. However, blasting will be carried out only with permission of MPW, using a pre-established schedule. Where possible blasting mats will be used to reduce noise levels when blasting is carried out. Nearby communities will be informed about the schedule of controlled blasting during the construction phase.

4.2 Physical Environment

4.2.1 Geology:

74. Afghanistan has some of the most complex and varied geology in the world. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. To the east of the Afghan Block is a complex collage of tectonic units that marks the collision zone with the Indian plate. The dominant rocks along the Project road alignments are sedimentary and volcanic rocks. The rocks are limestone and marls, sandstones, volcanic and green schists.

4.2.2 Climate and Meteorology:

75. Afghanistan's climate is continental in nature, with cold winter and hot summer. Most of the country is semi arid or arid, with low amount of precipitation and high or very high variability between years. Snowfall is concentrated in the central mountains and the higher ranges of the northeast. Winter temperatures are extremely low in the study area where temperature dips to - 10°C in north eastern mountainous region during winter. Snowfall thicknesses can be up to 2 to 3m thick during the winter months, in the eastern region of Badakhshan. Most of the annual precipitation occurs in the project area in the winter and spring.

76. The climate of Beharak and Eshkashim through which the road runs is arid to semi-arid. Afghanistan weather is characterized by dry hot cloudless summers and severe winters. The areas lying in the north-eastern part of the mountains experience sub-arctic conditions having dry and cold winters.

4.2.2.1 Temperature:

77. Temperature and precipitation are related for the hydrological analyses of the road project are discussed below. At Faizabad, one of stations along the river, long time data could not be obtained. However, with the available data the predicted average minimum daily temperature may go down to -10.28°C and it may fall to -20.15°C in a fifty year return period. The average maximum daily temperature reaches 35.64°C and it may rise to 39.22 °C in fifty-year return period. The average monthly temperature of Faizabad is given in Table 4-3 below:

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------|-------|-------|------|------|------|-------|-------|-------|-------|------|------|-------|
| Average | | | | | | | | | | | | |
| Temperature | | | | | | | | | | | | |
| in °C | -6.36 | -3.73 | 3.56 | 9.67 | 13.5 | 16.94 | 18.84 | 18.14 | 14.23 | 8.65 | 2.31 | -3.23 |

Table 4-3: Average Monthly Temperature

78. Pavements, like all other materials, will expand as they rise in temperature and contract as they fall in temperature. Small amounts of expansion and contraction are typically accommodated without excessive damage, however extreme temperature variations can lead to catastrophic failures. The road design considered sound engineering practices, such as contraction and expansion joints, air entrainments, so that it will function steadily during the warmest and coldest temperature of the year. The temperatures in the Project area may vary in the range of -10 ^oC to +35 ^oC over fifty year return period.

4.2.2.2 Precipitation

79. There is a rise in the mean precipitation as one goes from the western side to the eastern side of the mountains, the average being 400 mm in the south-eastern monsoon areas. Mostly, the precipitation takes place from December to April. Highlands experience snowfall during December-March and the lowlands experience intermittent rainfall from December to May. The regional characteristic of precipitation is depicted in Figure 4.3.



Figure 4-3: Regional Variation of Precipitation over Afghanistan by Seasons

80. The annual average precipitation at Beharak, the closest station having long time data is 390.13 mm. The monthly average of the station is given in Table 4-4.

| Month (mm) | Jan | Feb | Mar | Apr | Мау | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------------|-------|-------|-------|-------|-------|-------|--------|-------|-------|------|------|------|
| Faizabad | 12.83 | 40.07 | 40.40 | 60.59 | 68.36 | 92.66 | 101.51 | 11.22 | 4.93 | 1.04 | 1.67 | 0.73 |
| Beharak | 18.08 | 28.56 | 31.84 | 34.14 | 42.33 | 69.74 | 74.17 | 65.19 | 10.77 | 5.17 | 8.21 | 2.58 |

Table 4-4: Average Monthly Precipitation of Faizabad and Bharak

81. The total precipitation in the area under influence of the road may be understood from the diagram showing the precipitation and temperature as given in Figure 4-4. The average precipitation of the influence area shows virtually no precipitation in the summer and very little in the autumn. Snowfall occurs in the winter and small rainfall in the spring.



Figure 4-4: Month-wise Variation in Temperature and Rainfall

82. The precipitation data recorded at a station close to the road and that of the region obtained from secondary sources depict average precipitation in the four seasons as given in Table 4-5 below.

| Location | Average Precipitation by Seasons (mm) | | | | | | | |
|----------|---------------------------------------|--------|-------|--------|--------|--|--|--|
| | Spring | Summer | Fall | Winter | Total | | | |
| Faizabad | 221.61 | 117.66 | 3.43 | 93.29 | 435.99 | | | |
| Beharak | 146.20 | 150.13 | 15.95 | 78.49 | 390.77 | | | |

| Fable 4-5: Seasonal | Variation of | Precipitation | in Project Area |
|---------------------|--------------|---------------|-----------------|
|---------------------|--------------|---------------|-----------------|

83. The project road elevation starts at about 1448 m above sea level (asl) at Beharak to about 2,984 m asl at highest peaks of mountains at KM 96+740 and again falls to around 2,453 m asl at Eshkashim. Snowfall is the main source of precipitation in the area under study. This may be considered to be closely related with the temperature of the road alignment. Number of days when snowfall occurred over the last 4 years at Faizabad, Beharak, Warduj, Zebak, and Eshkashim is given in Table below:

| Year | Number of Snowfall Days | | | | | |
|-----------|-------------------------|----------|---------|-----------|--|--|
| | Faizabad* | Beharak* | Warduj* | Eshkashim | | |
| 2007–2008 | 3 | 21 | 8 | No data | | |
| 2008–2009 | 19 | 17 | 8 | 48 | | |
| 2009–2010 | 17 | 9 | 9 | 41 | | |
| 2010–2011 | 18 | 24 | 24 | 38 | | |

 Table 4-6: Snowfall Days in the Influence Area of the Proposed Road

*Data from Afghan Agro-Meteorological Seasonal Bulletin, Agromet Network, AMA, FAO, USGC

84. It is apparent that the snowfall was high in the year 2010–2011. Though the snowfall takes place for limited number of days but the area remains under frost for many days. The yearly number of frosted days in Beharak remains mostly over 9 days and it was 24 days in 2010–2011 and Eshkashim is experience higher frosted days. Considering the frosted days construction planning should be adopted.

85. About 80% of Afghanistan's natural source of water is in the form of snow precipitation at elevations above 2,000 m. As a result, the country is covered by a relatively dense network of rivers although most of the smaller rivers only run with water during rainy period or during the thaw.

4.2.2.3 Humidity:

86. Humidity in the project area is moderate but maximum humidity is observed in the range of 70% to 80% during the months of December to March when significant precipitation takes place. Average minimum humidity recorded is below 34% in the month of June to September.

4.2.3 Water Resource

4.2.3.1 Surface Water Resource:

87. Afghanistan is divided into five major river basins, which comprise 41 watersheds. The major river basins are: (i) Amu Darya River Basin, which contributes 57 % of the total river flow in Afghanistan, (ii) Northern River Basin, (iii) Harirud–Murghab River Basin and (iv) Kabul (Indus) River Basin and (v) Northern, as well as five non-drainage areas. The Project is located in the Northern River Basin.

88. River flows in Afghanistan depend on the magnitude of annual rain and snow fall. When snow begins to melt in late winter and spring, the rivers rise. Most of the rivers in Afghanistan have a peak flow at the end of the winter and in spring and a minimum flow in summer and autumn. Warduj (Wakhan) River, which is traversed parallel to the road, is one of the main

rivers of the basin. The other important river is Wijling River, which flows along the road from mid of the road to the Netsun.

89. The Project road passes mostly along/near the river basin till Netsun (km 94+500) so water is not a problem is this area unlike rest of the Afghanistan, but the availability of pure and safe drinking water is still a cause of concern due to unhygienic, unhealthy disposal of solid and liquid wastes. The Project Road runs parallel with two rivers, from Beharak (km 0/0), up to Dag-Khana (km75/0) Project Road runs parallel to Warduj (Wakhan) River and beyond Dag-Khana (km74/0), up to Netsun (km 94/500) Project Road runs within Wijling River Basin. The rivers are perennial in nature. The close proximity of Project Road with the rivers, call for major environmental avoidance and mitigation measures. The quantity of water available in the Proposed Project for construction activity is greater than that in many other areas of Afghanistan.

4.2.3.2 Groundwater Resource:

90. Groundwater is available in valleys of Warduj River and Wijling River. Local people use the water using hand pumps. Local people did not raise any problem during pubic consultation in respect of water. However, in a groundwater quality survey of 1,400 wells in the country conducted in 1996, it was reported that 45% of wells exceeded US Environmental Protection Agency Standard for *E. Coli* and 10.8% exceeded nitrate standard.

91. No construction information, hydraulic data, or water-chemistry data from wells constructed in this project area are available. However, Water samples tested by the DACAAR of Faizabad depict that aquifer quality is within allowable limit of WHO standard as depicted in the Table 4-7 below:

| Sr/No | Water Quality Parameters | Results | WHO Guideline Value for Drinking Water |
|-------|--------------------------------|---------|---|
| 1 | EC (µS/ cm) | 662 | 3000 (for Afghanistan) |
| 2 | рН | 7.7 | 6.5-8.5 |
| 3 | Chloride (mg/L) | 11 | 250 |
| 4 | Sulphate (mg/L) | 140 | 250 |
| 5 | Fluoride (mg/L) | 0.67 | 1.5 |
| 6 | Nitrate NO ₃ (mg/L) | 3.46 | 50 |
| 7 | Nitrite NO ₂ (mg/L) | 0.001 | 3 |
| 8 | Boron (mg/L) | 0.80 | 0.5 mg/l B or 2 mg/l BO ₂ . |
| 9 | Sodium (mg/L) | 104 | 200 |
| 10 | Chromium (mg/L) | 0.00 | 0.05 |
| 11 | Arsenic (mg/L) | 0.000 | 0.01 |
| 12 | Faecal Coliform Col/100ML) | 57 | 0/100 ml |

 Table 4-7: Chemical and Microbiological Analysis of Water Sample of Faizabad Area

Source: DACAAR

4.2.4 Drainage Congestion/Water Logging:

92. Road interferes with cross drainage and can cause flooding or drainage congestion in adjacent areas during period of high rainfall. This may cause crop damage and in extreme cases permanent loss of agricultural land. Drainage of the water from hill slopes and road surface is very important. All artificial drains shall be linked with the existing natural drainage system. Most of the existing structures are in the habitation area. The structures are on both

drainage and irrigation channels. The irrigation crossings are not part of any planned integrated project rather these are provided to allow seepage of water from hills to flow into the agricultural plots across the existing road. These are mostly small and have a size of 0.6m X 0.7m. The road proposed is wider than the existing roads. The drain sizes are to be increased to allow cleaning when required. In consideration of the local demand, the sizes of the structure have been modified to 1mx1m. Adequate numbers of cross drainage structures have been provided for efficient drainage and preventing any drainage congestion. Location and alignment of culverts should also be so chosen as to avoid severe erosion at outlets and siltation at inlets.

93. The Project Road follows the Right bank of the Warduj River for its major length. In addition to the Warduj and Wijling, the ROW is crossed by a significant number of unnamed watercourses, many of which have washed out portions of the road and culverts intended to accommodate the flow. As such, a total of 5 new bridges, 353 new reinforced concrete box culverts of various sizes will be constructed. In many locations existing pipe/box culverts will be affected and replaced with new structures.

4.2.5 Natural Disasters:

94. Afghanistan, in general, is prone to a number of natural disasters: earthquakes, flooding, drought, landslides and avalanches. In the project area there is little possibility of avalanches as no such location exists.

95. Afghanistan regularly experiences flooding, earthquakes, avalanches, landslides and drought, in addition to other man-made disasters resulting in frequent loss of lives, livelihoods and property; contributing to high levels of poverty across the country. In particular, the country's Northern provinces can be severely affected by both floods and landslides. Seasonal rains and spring snow-melt regularly result in life-threatening flash flooding in the region.



Figure 4-5: Natural Disaster (Flood) Occurred in 2007 in Afghanistan

Source: ADB published document.

4.2.5.1 Earthquake:

96. Seismicity in the region is not distributed uniformly. Within the wide deforming belt are several large areas, such as western and central Afghanistan, that appear to have relatively little seismicity during the 20th century and to behave as effectively rigid blocks. Eastern Iran is dominated by two belts of N-S right-lateral strike-slip faulting following the east (Sistan) and west (Nayband–Gowk) sides of the relatively a seismic Dasht-e-Lut block. Both belts contain long strike-slip faults but also exhibit components of shortening and reverse faulting. These belts accommodate N-S right-lateral share and some shortening between central Iran and western Afghanistan. Deformation along the eastern and western margins of Afghanistan is highlighted by seismicity throughout historic and recent time. Afghanistan appear to be a promontory of Eurasian plate penetrating southward between Iran and India, with relatively high seismic evidence in northern Faizabad and eastern Eshkashim for significant convergence in the northeastern Afghan mountains. The entire length of the Project Road as per the seismic hazard map shown as Figure 4-6 below falls in the category of relatively high (VIII- potentially prone to earthquakes up to 7.3 on the Richter scale) magnitude earthquake zone.

97. An example of the strength of Earthquakes in this region occurred during February of 1998 in Badakhshan and Rustaq where at least 2,323 people were killed, 818 were injured, 8,094 houses were destroyed and 6,725 livestock were killed. Landslides could result from seismic activity in the region.

98. Seismic activity could also have significant effects on the 5 new bridges that will be constructed (including 2 multi-span and 3 single-span structures).



Figure 4-6: Seismic Hazard Map of Afghanistan

Source: ADB published document.

4.2.5.2 Flood:

99. In the project influence area floods occurs after heavy rainfall. For instance, In 2 May 2014 there were rainfall on two consecutive days in the catchment of Nowabad area of Abi-Barak village, Argo district in Badakhshan Province and severe flood followed the rainfall on the following day. About 300 houses were destroyed another 1,000 were affected and 500 people were killed by the flood.

4.2.5.3 Drought:

100. The precipitation in the project areas varies significantly over years. In some years the rainfall is meager in comparison with the average of the year. In recent time drought in Afghanistan led to the loss of about 1/3rd of the cattle population in the drought year.

4.2.5.4 Landslides:

101. The project districts of Badakhshan are prone to landslide due to bare hillocks and mountain. Several sizable landslides exist along the present as well as the proposed new alignment. The main causative factors of these landslides are fragility of the geologic and geomorphic setting; climatic factors such as rains and snow; and the reduction of shear parameters due to an increase of pore water pressure by saturation during spells of torrential

precipitation and undercutting/toe erosion by rivers/streams. Rock falls occur along closely spaced and steeply dipping joints, while planar and wedge failures occur due to the intersection of adversely-oriented joint planes. The road crosses several stiff cliffs. The road cutting takes care of situation prevailing at the critical locations.

- i. **2 May 2014:** A landslides occurred in Nowabad area of Abi-Barak village, Argo district in Badakhshan Province. The Afghan Government and humanitarian partners confirmed that up to 500 people lost their lives and over 1,000 families were affected by the landside which took place on 2 May, following heavy rains. Some 300 homes were destroyed and the majority of the displaced families were staying with host families and in tents distributed by UN Agencies and NGOs.
- ii. **25 June 2007**: Eight members of a family were killed this month when a landslide caused by melting snow hit a village in neighbouring Takhar province.
- iii. **3 March 2002**: More than 300 houses were destroyed in the district of Jurm, Badakhshan. A landslide also partially blocked the Salang Tunnel linking northern Afghanistan with southern areas.

102. The project road passes through the some rock sliding zones, during melting of snow as well.



Snaps: Typical Example of Poor Horizontal Geometrics and Close Proximity with Valley River

4.2.6 Soil Characteristics and Construction:

103. Soils in the project area primarily consist of sediments eroded from the mountains and comprise alternating layers of gravel, sand, silt and clay. Adjacent to the mountains, the sediments are dominated by coarse deposits such as grave and pebble, deposited by the runoff water from the mountains. Further away from the mountains, the deposits would be expected to become increasingly dominated by finer sediments such as fine sands/silts. In many cases the Project Road bisects these areas and as such construction activities may interfere with the productive soils if they are not properly managed. Further up the valley slopes soils were loose and fragmented. Consultation with locals revealed that landslides are a regular occurrence within the valley. Given the relatively narrow width of the Project Road, landslides have the potential to cut the road off from passing traffic for extended periods. Worse still, landslides could, and have, caused fatal accidents especially on the high valley slopes.

4.2.7 Noise Level:

104. There is no continuous noise monitoring in the Project influenced area. The field visit reveals that vehicular traffic, which is low in volume, is the main source of noise. The noise from vehicles on dirt road when going uphill rises significantly. This is also felt along the small habitation area along the road. After construction of the road this noise is expected to come down.

4.2.8 Air Quality:

105. There is no record of air quality data in the area. The major source of air pollution is wind. Wind adds substantial dust to the air in the project area. All roads in the area are either unpaved gravel roads or local earthen tracks. Vehicles running along the first 10 Km of the road raise dust which is blown into adjacent trees and homesteads. The emission from the vehicles is also significant as more power is used for running of the vehicles on dirt road. The dust would become very negligible after the construction of the road. However, in the hilly uninhabited terrain the problem is not felt. Air quality standards are not yet established in Afghanistan. The ADB TA Kabul Air Quality Management has recommended ambient air quality standards for Afghanistan based on the WHO guidelines. The proposed AAQS standards for Afghanistan are presented in Table 4-8.

| Pollutant | Averaging Period | Interim Target 1, μg/m ³ | Interim Target 2, μg/m ³ | Interim Target 3, μg/m ³ | Final Target (Air Quality Guideline), μg/m³ |
|-------------------|---------------------|--|---|---|---|
| PM ₁₀ | Annual | 70 | 50 | 30.0 | 20.00 |
| | 24-hour | 150 | 100 | 75.0 | 50.00 |
| PM _{2.5} | Annual | 50 | 25 | 15.0 | 10.00 |
| | 24-hour | 75 | 50 | 37.5 | 25.00 |
| SO2 | 24-hour | 125 | 50 | | 20.00 |
| | 10 minute | | | | 500.00 |
| CO | 8 hour | | | | 0.01 |
| Ozone | 8 hour | 160 | | | 100.00 |

 Table 4-8: Proposed Ambient Air Quality Standards of Afghanistan

Source: Engconsult Ltd., KAQM Strategy Report, ADB TA 4415, 2007.

4.3 Biological Environment

4.3.1 Terrestrial Ecosystem:

106. Natural ecosystem and species make many important contributions to human welfare. Yet these very important resources are seldom being used in ways that will be able to meet the growing pressures of future high demands for both goods and services that depend upon these natural resources. There is still time to save species and their ecosystem. It is an indispensable prerequisite for sustainable development. It is necessary that all development and techniques or development for human welfare should be reviewed in the light of its suitability from the environmental and ecological points of view.

107. Here vegetation occur in the valleys of channels where there is some water flow or seepage from hill toes. Hill slopes are almost barren and have little herbs on which herds graze.

4.3.1.1 Terrestrial Flora:

108. A total of 25 Terrestrial Flora Species were recorded during survey period in the project area. Flora identified through interview to the local people (Photo-7 & 8) of the project area were classified under two categories viz. terrestrial flora and medicinal flora. Within these floras, there are 20 natural plants and nine are medicinal plant. Recorded terrestrial flora from field area under each category has been presented in the following Table No 4-9.

109. Within the Project Area trees line either side of the Project Road near the out skirls of both Warduj and Eshkashim. Most of the trees appeared to be fairly immature with trunks no more than 10-15 centimeters in diameter. Some sparse groupings of trees could be observed on the valley slopes at approximately KM Arder–Awar (KM 3+000–KM 20+000), Zu–Ekshire (KM 24+000–KM 27+000), Sufian (KM 36+000–KM 37+000), Tirgaran–Kazdai (KM 46+000–KM 48+000), Abdew (KM 61+000– KM 61+500), Dagkhana (KM 79+000–KM 80+000), Bazgir–Kangarak (KM 95+000–KM 98+000) and Eshkashim–Sukumal (KM 103+000–KM 107+000).

110. However, they all are not likely to be affected by project works due to their precarious positioning on the steep valley slopes (in general, trees that remain in this region have been spared by their remote or inaccessible locations). Fruit trees were dominant in the agricultural is, apricot, mulberry and apple being the main species grown. Agricultural crop included wheat and a variety of vegetables.

| SI. No | English Name | Scientific Name | Status ₁ |
|---------|---------------------|----------------------|--------------------------|
| 1 | Kikar | A. nilotica | Not yet been assessed |
| 2 | Chinar | Platanus Orientalis | Lower Risk/least concern |
| 3 | Figs | Ficus carica | Least Concern |
| 4 | Walnuts | Juglans | Data Deficient |
| 5 | Plum | Prunus domestica | Lower Risk/least concern |
| 6 | Almond | Amygdalus buharica | Not yet been assessed |
| 7 | Grape | Vitis vinifera | Least Concern |
| 8 | Mala (Napier grass) | Pennisetum purpureum | Not yet been assessed |
| 9 | Apple | Malus pumila | Data Deficient |
| 10 | Apricots | Prunus armeniaca | Not yet been assessed |
| 11 | Pine Nuts | Pinus | Least Concern |
| 12 | Mulberry | Morus Alba | Not yet been assessed |
| 13 | Willow | Salix spp | Not yet been assessed |
| 14 | Pomegranate | Punica granatum | Least Concern |
| 15 | Quince | Cydonia | Not yet been assessed |
| 16 | Oranges | Citrus sinensis | Not yet been assessed |
| 17 | Cherries | Prunus | Not yet been assessed |
| 18 | Spinach | Spinacia oleracea | Not yet been assessed |
| 19 | Dates tree | Dactylifera | Not yet been assessed |
| 20 | Kabal (Bermuda) | Cvnodon dactvlon | Not yet been assessed |
| Medicir | al Plants | | |
| 21 | White poplar | Populus alba | Not yet been assessed |
| 22 | Black poplar | Populus nigra | Not yet been assessed |
| 23 | Caraway | Carum carvi | Not yet been assessed |

Table 4-9: Terrestrial Flora in the Project Area

| SI. No | English Name | Scientific Name | Status1 |
|--------|-------------------|--------------------|-----------------------|
| 24 | Coriander(shrubs) | Coriandrum sativum | Not yet been assessed |
| 25 | Garlic | Allium sativum | Not yet been assessed |
| 26 | Henbane | Hyoscyamus niger | Not yet been assessed |
| 27 | Marihuana | Cannibas sativa | Not yet been assessed |
| 28 | Opium | Papaver somniferum | Not yet been assessed |
| 29 | Jujube | Ziziphus zizyphus | Not yet been assessed |

Source: Field Survey Data

1.Status as per the IUCN Red List of Threatened Species http://www.iucnredlist.org/static/categories_criteria_3_1



Photo-7 Interview to the Local People at Chakaran, Warduj



Photo-8 People at Chakaran, Warduj will support the project

111. Fauna were identified in the area of influence through discussion with knowledgeable persons and through observation. Among the fauna of the area large vertebrates such as Turanian Tiger and Cheetah have been totally eradicated. Mountain deer are learnt to occur in the valleys of hills and occasionally found. Many game birds such as pheasant, partridge and large predators like eagles, falcons, and vultures are diminished. In addition, desert lizard and snake are also declining. Consultation with local residents revealed that the most prominent animal species in the Project Area were fox, watt, and rabbit. The factors that make the Project Road ROW and the adjacent areas an unlikely venue for threatened and endangered plant species also makes it an unlikely for special status wildlife species. Field investigations revealed no evidence of existing conditions suggesting possibilities of habitat loss; habitat fragmentation, interruption of wildlife migration patterns or significant patterns of accidents involving wildlife within the vicinity of the project road. Herd of yaks (*Bos grunniens*) near Bazgir, Eshkashim in the Wakhan Corridor, Badakhshan Province. The yaks are frequently used by local people for transportation, milk, and meat.

112. Among the common animals there exist wolves, foxes, hedgehog, polecat, hare and rodents such as squirrels, rats and mouse. The recorded terrestrial fauna from field area has been presented in the following Table 4-10 below:

| SI. No. | English Name | Scientific Name | Status1 |
|---------|-------------------------------|------------------------------|-----------------------|
| 1 | Red fox | Vulpes vulpes | Least Concern |
| 2 | Stone marten | Martes foina | Least Concern |
| 3 | Weasel | Mustela nivalis | Least Concern |
| 4 | Cape Hare | Lepus capensis | Least Concern |
| 5 | Crested porcupine | Hystrix indica | Least Concern |
| 6 | House Mouse | Mus musculus | Least Concern |
| 7 | Midday Gerbil | Meriones meridianus | Least Concern |
| 8 | Social Vole | Microtus socialis | Least Concern |
| 9 | Horse | Equus caballus | Not yet been assessed |
| 10 | Wild Boar | Sus scrofa | Least Concern |
| 11 | Bactrian Deer | Cervus elaphus Bactrianus | Not yet been assessed |
| 12 | Yak | Bos grunniens | Not yet been assessed |
| 13 | Short-tailed Bandicoot Rat | Nesokia indica | Least Concern |
| 14 | Field Mouse | Apodemus sylvaticus | Least Concern |
| 15 | Afghan Pika | Ochotona rufescens | Least Concern |

Table 4-10: Name of the Fauna

Source: Field Survey Data

1 Status as per the IUCN Red List of Threatened Species http://www.iucnredlist.org/static/categories_criteria_3_1

4.3.2 Aquatic Ecology:

113. Warduj as well as Wijling Rivers is poor in terms of aquatic flora and fauna. Although fishes constitute part of the ecology of surface water in the study area but the quantity and diversity is very low. Fishery and fishing are not parameters of significant importance. As such, local economy does not depend upon the fish production and there exist no fishing community in the area. Aquatic diversity including fish in very meagre and the river are reported to have very few fish species that include Walrus, Tattoo etc.

114. The riverbed is poor in terms of aquatic flora and fauna. Although fishes constitute part of the ecology of the surface water in the study area, fishermen are, in general, absent due to the absence of much fish in the river. The local economy does not depend upon the fish production in this area; however, the following fishes are available in the Warduj and Wijling River.

115. Two types of fish were identified during the site visit at the Project Site along with the Rivers. The identified fishes are:

i. 'Mahi laqa' (Glyptosternum reticulatum), a large fish found in the Warduj River and the Wijling River. The scientific name given above is cited by Louis Dupree; but according to him, the fish is a type of European catfish which grows up to seven feet in length. ii. Barbels (in the carp family), said to be of the species Barbus capito conocephalus, are found in the Wijling River. These are locally called 'shir-mahi, which means 'milk fish'.

4.3.3 National Parks, Wildlife Sanctuaries and Other Protected Area

116. According to Environmental Act (Article 43) there are six categories of protected areas in Afghanistan, which are as follows.

- i. Strict Nature Reserve
- ii. National Parks
- iii. Natural Monument
- iv. Habitat/Species management
- v. Protected Landscape and
- vi. Managed resource Protected Area.

117. NEPA is in the process of consultation with ministries and Provincial Council and District and Village Councils to prepare guidelines for the management of each category of protected areas. Government is also re-categorising the existing protected areas for better management of environmental resources.

118. Under article 45 of the Environmental Act, the destruction of habitat of protected species by any person, including the State is prohibited and offenders shall be duly prosecuted. Presently, there is no list of protected and harvestable species in Afghanistan. The NEPA with the assistance of academic institutes and relevant ministries is preparing a list of such species. There is no list of threatened species in Afghanistan; however Bactrian Deer, which is found in the project area, is on the red list of IUCN.

4.3.4 Biodiversity Protected Area

119. There are at present three Biodiversity sites as given in Table 4-11 (a). In addition three more sites are proposed to be developed as protected sites in the form of national parks given in Table 4-11 (b).

120. There are no designated National parks and Wildlife Sanctuaries in the project area. Protected areas or nature reserves or significant temporary habitats of migratory species do not exist neither in the corridors under study nor in their vicinity. However, the nearest protected area/national park, known as Pamir-I Buzurg (Wakhan National Park, Wildlife Reserve), is situated about 150 km. away from the end point (Eshkashim City) of the Project. The proposed road project will not affect the park rather will inspire protection measure as well as tourism.

121. All existing and proposed biodiversity protected areas are far from the project areas.

| SI. No | Name | Area (ha) | Year | Elevation (m) | Designation | IUCN Category |
|-----------|-------------------|--------------|------|------------------|------------------------|------------------|
| 1 | Dashte Nawar | 7,500 | 1977 | 3,200- 3,210 | Waterfowl Sanctuary | IV |
| 2 | Pamir-I Buzurg | 67,938 | 1978 | 3,250- 6,103 | Wildlife Reserve | IV |
| 3 | Ab-I Estada | 27,000 | 1977 | 1,950- 2,100 | Waterfowl Sanctuary | IV |

Table 4-11 (a): Biodiversity/Protected Areas

| Table | Table 4-11 (b): Proposed National Park | | | | | | | | |
|-------|--|--------|------|-----------------|------------------------|----|--|--|--|
| 4 | Ajar Valley | 40,000 | 1978 | 2,000- 3,800 | Wildlife Reserve | IV | | | |
| 5 | Band-e- Amir | 41,000 | 1973 | 2,900- 3,832 | National Park | II | | | |
| 6 | Kole Hashmat Khan | 191 | 1973 | 1,792- 1,794 | Waterfowl Sanctuary | IV | | | |

122. In addition to the protected sites given above another nine sites were identified for protection. But after 1979, all conservation work came to an abrupt halt and remaining proposals for an expansion of the nature reserve system in Afghanistan could not be materialized. The list of the proposed sites is given in Table 4-12:

| Name | Desig- nation | IUCN CAT | Min Elev (m) | Max Elev (m) | Latitude | Longitude | Udvardy Province | Biome | Event | Area (ha) | Data Source |
|---------------------------|------------------------|-------------|--------------------|--------------------|------------------------------|------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------|----------------|
| Band-i- Amir | National Park | II | 2900 | 3832 | 34° 52' 40"N (34.878°) | 67° 16' 51"E (67.281°) | Anatolian- Iranian Desert (20) | Cold- winter deserts (08) | Designated 1 January 1973 | 41,000 | |
| Ajar Valley | National Park | | 2000 | 3800 | 35° 21' 21"N (35.356°) | 67° 19' 17"E (67.322°) | Hindu Kush Highlands (37) | Mixed mountain systems (12) | Proposed | 40,000 | |
| Ab-i- Estada | National Park | | 1900 | 2100 | 32° 28' 58"N (32.483°) | 67° 56' 14"E (67.937°) | Anatolian- Iranian Desert (20) | Cold- winter deserts (08) | Proposed | 27,000 | |
| Nursitan | National Park | | 4876 | 6293 | 36° 34' 43"N (32.483°) | 70° 50' 16"E (70.838°) | Himalayan Highlands (38) | Mixed mountain systems (12) | Proposed | | |
| Ab-i- Estada | Waterfowl Sanctuary | IV | 1950 | 2100 | 32° 28' 58"N (32.483°) | 67° 56' 14"E (67.937°) | Anatolian- Iranian Desert (20) | Cold- winter deserts (08) | Designated 1 January 1977 | 27000 | |
| Dasht-i- Nawar | Waterfowl Sanctuary | IV | 3200 | 3210 | 33° 49' 48"N (33.830°) | 67° 45'E (67.750°) | Anatolian- Iranian Desert (20) | Cold- winter deserts (08) | Designated 20 December 1977 | 7500 | |
| Hamun-i- Puzak | Waterfowl Sanctuary | IV | 1620 | 1731 | 31° 29' 44"N (31.496°) | 61° 42' 55"E (61.715°) | Iranian Desert (24) | Cold- winter deserts (08) | Designated 1 January 1973 | 35,000 | |
| Kol-i- Hashmat Khan | Waterfowl Sanctuary | IV | 1792 | 1974 | 34° 30'N (34.500°) | 69° 11' 59"E (69.200°) | Anatolian- Iranian Desert (20) | Cold- winter deserts (08) | Designated 1 January 1973 | 191 | |
| Ajar Valley | Wildlife Reserve | IV | 2000 | 3800 | 35° 21' 21"N (35.356°) | 67° 19' 17"E (67.322°) | Hindu Kush Highlands (37) | Mixed mountain systems (12) | Designated 1 January 1978 | 40,000 | |

 Table 4-12: Proposed Protected Areas in Afghanistan

Source: Biodiversity Profile of Afghanistan.



Figure 4-6: Protected Areas in Afghanistan

Source: Biodiversity Profile of Afghanistan.

4.4 SOCIOECONOMIC PROFILE

123. Badakhshan is undoubtedly one of the most under-developed and remote provinces of the whole mountainous region of Central Asia. Home to an estimated 1million people, the restricted access caused by such disparate and rugged geography have resulted in it being one of the last areas of Afghanistan to taste benefit from the various regimes which have ruled the country from the capital, Kabul over the last 100 years. During Taliban times Badakhshan was one of the few areas of the country that resisted the dominance of the Taliban forces, who were unable to penetrate this mountainous region, but as a result it remained surrounded and cut off from the rest of the country, Within the Urban areas of Beharak, Warduj, Zebak, Eshkashim and other small villages, commercial activities predominate on the roadsides, Out of the urban areas a variety of activities can be observed mainly relating to a agricultural practices. Afghanistan covers an area of 652,864 km² with its total population 27.5 million and population density 40.6 per square kilometre. The summary of socio-economic indicators of Afghanistan is given in the Table 4-13 below:

| SI. No | Variable | Rate/Quantity |
|------------|--|----------------------|
| 01 | Total area (square kilometer) | 652,864 |
| 02 | Total Population (million) | 27.5 million |
| 03 | Male/Female Ratio | 51:49 |
| 04 | Rural population | 19,747,500 |
| 05 | Rural Male Population | 10,080,800 |
| 06 | Rural Female Population | 9,666,700 |
| 07 | Urban population | 6275,600 |
| 08 | Urban Male Population | 3231,600 |
| 09 | Urban Female Population | 3044,000 |
| 10 | Total GDP (million in USD) | 21,200 |
| 11 | Contribution of agriculture in GDP | 24.6% |
| 12 | Contribution of industries in GDP | 19.7% |
| 13 | Contribution of services in GDP | 51.8% |
| 14 | Contribution of import tax in GDP | 3.59% |
| 15 | Per Capita GDP (in USD) | 772 |
| 16 | GDP growth rate | 6.4% |
| 17 | Population growth rate | 2.03% |
| 18 | Literacy rate | 28.1% |
| 19 | Female literacy rate | 12.6% |
| 20 | Crude birth rate (per 1000 pop) | 38.84 |
| 21 | Crude death rate(per 1000 pop) | 14.12 |
| 22 | Fertility Rate (children per woman | 5.43 |
| 23 | Infant Mortality Rate (per 1000 birth) | 117.23 |
| 24 | Life Expectancy Rate for Male | 49.17 |
| 25 | Life Expectancy Rate for Female | 51.88 |
| 26 | Average Life Expectancy Rate | 50.49 |
| 27 | Age Dependency Ratio | 4.6% |
| 28 | Child Woman Ratio | 1.06% |
| Source: CS | Ω Afghanistan Statistical Vearbook (2013-2 | 014) and Afghanistan |

Table 4-13: Summary Socio-economic Indicators of Afghanistan

Source: CSO Afghanistan Statistical Yearbook (2013-2014) and Afghanistan Demographics Profile 2014

4.4.1 Geography

124. Badakhshan province through which the road runs have area of about 17,414 square kilometres, is located in the north-eastern region, bordered by Takhar Province in the west and Nuristan in the south, and shares international borders with Tajikistan in the north, China in the east, and Pakistan in the south. The province covers an area of 47,403 km². Nearly nine-tenths of the province (89.9%) is mountainous or semi mountainous terrain while one-tenth of the area (9.7%) is made up of flat or semi-flat land, as the following Table 4.14 shows:

| Flat | Mountainous | Semi mountainous | Semi flat | Not reported | Total |
|------|-------------|---------------------|-----------|--------------|-------|
| 6.9% | 75.7% | 14.2% | 2.8% | 0.3% | 99.9% |

Table 4.14: Topography Type

Source: CSO/ UNFPA Socio Economic and Demographic Profile.

125. The province is divided into 28 districts and contains total 1,851 villages. The provincial capital is Fayzabad which has a population of about 61,057 inhabitants.

4.4.2 Population

126. Badakhshan has a total population of 819,396. There are 134,137 households in the province and households on average have 6 members. The following Table 4-15 shows the population by project influenced districts:

| SI. No. | Province | District | Male | Female | Total |
|---------|------------|-----------|--------|--------|--------|
| 1. | Badakhshan | Beharak | 15,100 | 14,500 | 29,600 |
| 2. | | Warduj | 10,700 | 10,200 | 20,900 |
| 3. | | Zebak | 3,900 | 3,600 | 7,500 |
| 4. | | Eshkashim | 6,700 | 6,500 | 13,200 |
| | | Total | 36,400 | 34,800 | 71,200 |

Table 4-15: Distribution of Population by Gender by Provincial District's Population by District

Source: CSO/UNFPA Socio Economic and Demographic Profile

4.4.3 Demography:

127. Almost all (96%) of the population of Badakhshan lives in rural districts while 4% lives in urban areas. Around 51% of the population is male and 49% is female. Dari is spoken by 77% of the population and 80% of the villages. The second most frequent language is Uzbeki, spoken by the majorities in villages representing 12% of the population. Other languages such as Pashtu, Turkmeni, and Nuristani are spoken by less than 1% of the population each. Badakhshan province also has a population of Kuchis or nomads whose numbers vary in different seasons. In winter 9,417 individuals, or 0.4% of the overall Kuchi population, stay in Badakhshan living in 34 communities. Nearly two-thirds of these (64%) are short-range partially migratory, and the other one-third have settled in the province. In the winter both groups stay mostly in one area and don't move around during the season. In the summer season, nearly 175,000 long-range migratory Kuchis come from Takhar, Kunduz, Baghlan, and Nuristan provinces to the Kistam, Tashkan, Taqab, and Arghanj Khawa districts of Badakhshan Province as summer pasture areas. The Kuchi population in the summer is 185,452 individuals.

POPULATION DATA REQUEST FROM ADB FOR PPMS (Observation: May–September 2014)

128. The dataset below was requested by ADB–we have comparative data records between May and September 2014. Districts–Beharak, Warduj, Zebak & Eshkashim. Population within 2 km of Road Center Line over the Length of the Project Road from household survey: Direction \rightarrow Beharak–Warduj–Zebak–Eshkashim

129. List of villages within 2 (two) kilometers from centerline of existing road alignment from Beharak to Eshkashim 108 KMs.

| SI. | Name of | Chainage | District | L/R | Households | Population |
|----------|----------------|----------|----------|------|------------|------------|
| No. | Villages | Km. | | side | | |
| 1 | Arder | 1 | Beharak | L/R | 207 | 1,457 |
| 2 | Adam Beki | 2 | | L/R | 218 | 1,538 |
| 3 | Yazkhchan` | 3 | | R | 211 | 1,521 |
| 4 | Chapak Sarrk | 4 | | L/R | 177 | 1,239 |
| 5 | Poshusstan | 5 | | L/R | 231 | 1,629 |
| 6 | Stain | 6 | | L | 171 | 1,241 |
| 7 | Oshkhan | 7 | | L/R | 159 | 1,127 |
| 8 | Wahil | 8 | | R | 201 | 1,437 |
| 9 | Murkhan | 9 | | L/R | 219 | 1,563 |
| 10 | Tarang | 10 | Warduj | R | 87 | 582 |
| 11 | Azakhcha | 11 | | L/R | 67 | 447 |
| 12 | Awji | 12 | | L | 59 | 483 |
| 13 | Passebagh | 13 | | L/R | 88 | 637 |
| 14 | Eshtakhan | 14 | | L/R | 76 | 523 |
| 15 | Khessraw | 15 | | L | 63 | 426 |
| 16 | Wakhiani | 15 | | L/R | 85 | 571 |
| 17 | Chakaran | 16 | | R | 121 | 837 |
| 18 | Wardui | 17 | | | 79 | 541 |
| 19 | Kuch | 18 | | L | 57 | 418 |
| 20 | Awar | 20 | | | 78 | 521 |
| 21 | Obian | 22 | | | 109 | 743 |
| 22 | Ghanew | 23 | | L/R | 65 | 439 |
| 23 | 70 | 20 | | L/R | 119 | 852 |
| 24 | Isterb | 25 | | | 61 | 468 |
| 25 | Umowl | 26 | | | 87 | 579 |
| 26 | Ekshire | 27 | | L/R | 117 | 791 |
| 27 | Pavzh | 28 | | L | 71 | 535 |
| 28 | Bashanabad | 30 | | L | 91 | 657 |
| 29 | Kosang | 32 | | L/R | 114 | 757 |
| 30 | Sufian | 36 | | R | 81 | 558 |
| 31 | Nulan | 39 | | R | 67 | 438 |
| 32 | Tirgaran | 45 | | L/R | 109 | 745 |
| 33 | Kazdai | 48 | | L/R | 71 | 539 |
| 34 | Alezhaerew | 49 | | R | 58 | 423 |
| 35 | Sarask | 51 | | R | 91 | 629 |
| 36 | Gulkhana | 54 | Zebak | L/R | 197 | 1.431 |
| 37 | Dasthe Khan | 56 | | L/R | 203 | 1,479 |
| 38 | Zarkhan | 58 | | L/R | 171 | 1,239 |
| 39 | Dandzebok | 59 | | L/R | 194 | 1.451 |
| 40 | Abdaw | 61 | | R | 173 | 1 245 |
| 41 | Kabek | 74 | | | 141 | 1 035 |
| 42 | Robate Cheltan | 76 | | | 219 | 1 527 |
| 43 | Dagkhana | 79 | | | 169 | 1 239 |
| 44 | Razrak | 86 | | | 252 | 1 832 |
| <u> </u> | | | | - | 202 | 1,002 |

Table 4-16: Villages located at the Project Road and the population in its influence Areas

| SI. | Name of | Chainage | District | L/R | Households | Population |
|-----|------------|----------|-----------|--------|------------|------------|
| No. | Villages | Km. | | side | | |
| 45 | Netsun | 92 | | L | 263 | 1,923 |
| 46 | Ujling | 94 | Eshkashim | L/R | 71 | 532 |
| 47 | Bazgir | 96 | | L/R | 114 | 782 |
| 48 | Kangarak | 98 | | L/R | 107 | 765 |
| 49 | Teshken | 100 | | L/R | 115 | 838 |
| 50 | Kushpak | 101 | | L/R | 121 | 931 |
| 51 | Wahdatabad | 102 | | L/R | 108 | 729 |
| 52 | Eshkashim | 103 | | L/R | 256 | 1,736 |
| 53 | Nechem | 104 | | L/R | 115 | 779 |
| 54 | Qasdae | 105 | | L/R | 79 | 537 |
| 55 | Saeyad | 106 | | L/R | 97 | 691 |
| 56 | Sukumal | 107 | | L/R | 75 | 561 |
| 57 | Darwand | 108 | | L/R | 94 | 635 |
| | | | 7,299 | 51,808 | | |

Summary of Villages with Present House Hold and Population on Existing Alignment

130. There are 57 villages with population 51,808 and house hold is about 7,299 within 2 km of existing road alignment of Beharak-Warduj-Zebak-Eshkashim 108 Km (Table-4-17).

Table-4-17: Summary of Villages with Present Household

| Districts | No. of Villages | Households | Population |
|-----------|-----------------|------------|------------|
| Beharak | 9 | 1,794 | 12,752 |
| Warduj | 26 | 2,171 | 15,139 |
| Zebak | 10 | 1,982 | 14,401 |
| Eshkashim | 12 | 1,352 | 9,516 |
| Total | 57 | 7,299 | 51,808 |

Village household size of Beharak and Zebak is larger than Warduj and Eshkashim.



Map 2: Layout Map of Beharak–Eshkashim Road Project 108 Km Connecting Warduj and Zebak districts

4.4.4. Human Resources:

131. Literacy rates in Faizabad, Bahara, Warduj, Zebak and Eshkashim are low. Labor in the Project area is generally unskilled and the low capacity of the Badakhshan workforce is hampering the possibilities for economic development in the province. There is severe scarcity of technical and higher skilled people in Badakhshan. The skilled ones have migrated out of the country or live and work in Mazar and Kabul and are not interested in coming back given the infrastructure and facilities in Badkhshan. This represents one of the most fundamental impediments to long term development in the province.

4.4.5. Gender Issues:

132. The women of the households affected by the project development are generally housewives. Gender is a mute issue in the project area, that is, nobody discusses it. In the socio-economic survey, this mute issue is highlighted by the fact that the women have very limited participation in economic and non-economic activities.

4.4.6. Ethnic Group:

133. The Tajik (Shaqany, Qharqhza, Zebaki tribes) is the main ethnic group in the area (from 90% to 99%). Other like Hazara, Uzbek and Pashtun are minority in the study area.

4.4.7. Agriculture and Rural Development

134. Enhancing licit agricultural productivity, creating incentives for non-farm investment, developing rural infrastructure, and supporting access to skills development and financial

services will allow individuals, households and communities to participate licitly and productively in the economy. As agriculture represents the major source of income for more than half the households in the province, rural development will be a key element of progress in Badakhshan. The most important field crops grown in Badakhshan province include wheat, barley, maize and rice; flax and melon/water melons. The most common crops grown in garden plots include fruit and nut trees (61%), vegetables (5%) and produce such as potatoes, beans and alfalfa, clover or other fodder. Wheat (18%) is also frequently gown I garden plots in the province. Nearly nine out of ten households with access to fertilizer use this on field crops (88%) and to a much lesser degree on garden plots (4%), although nearly one tenth of households use fertilizer on both field and garden (9%). The main types of fertilizer used by households in the province are shown in the following Table 4.18.

Table 4.18 Main Type of Fertilizer Used by Hhouseholds

| Human | Animal | Urea | | DAP | |
|-------|--------|------|------------------------------|-----|------------------------------|
| (%) | (%) | (%) | Average kg per households | (%) | Average kg per households |
| 10 | 36 | 56 | 86.8 kg | 46 | 69.8 kg |

Source: National Risk and Vulnerability Assessment, 2008.

135. On average 46% of households in the province have access to irrigated land, and two thirds of households (65%) have access to rain-fed land.

Table 4.19: Household's Access to Irrigated and Rain-fed Land

(%)

| | Rural | Urban | Average |
|--------------------------|-------|-------|---------|
| Access to irrigated land | 46 | - | 46 |
| Access to rain-fed land | 65 | - | 65 |

Source: National Risk and Vulnerability Assessment, 2008.

4.4.8. Physical Infrastructure:

136. A lack of power and poor roads are current obstacle to economic development in Beharak, Warduj, Zebak and Eshkashim. There is no power grid in Beharak to Eshkashem and power is mostly produced through generators. The government is planning to place a hydropower generator in the Faizabad area to provide electricity to the shopkeepers, university and schools in the surrounding area. Demand for power within Community is high: the majority of projects implemented within TNDIP T4 influence area are either micro hydro power projects or solar panelling projects. The potential for water as source of power is high by the availability of water in many areas in the province and that existing water sources often freeze during the winter period. Experience suggests that solar panelling is a good alternative in the absence of other potential sources, though it can only provide power for lighting purposes and not for industrial use.

4.4.8.1 Other Infrastructures:

137. Water Supply Systems: No piped water supply systems are likely to exist in or near the ROW in the portion of the roadway through urban Warduj, Zebak and Eshkashim.

138. **Wastewater Collection Systems:** Virtually no rural areas and few residential or public buildings in Afghan cities have networked wastewater collection sewerage facilities and those that do discharge their wastewater directly into rivers without treatment. No piped wastewater collection systems are known to be within the potential direct impact area.

139. Electrical Systems: There is potential for large scale exploitation of hydroelectric resources within Badakhshan. However, no such facilities are known to exist within the Project Area.

140. Irrigation Systems: Portions of the Project areas are irrigated. Such systems appear to be highly localized and accommodated by the Project Road's existing (albeit ill maintained) drainage structures.

4.4.9. Institutional Constraints:

141. There is a general lack of legal and social structures in the provinces with which to create an enabling environment for business and agricultural development. The government has little capacity with which to establish such a legal framework and has shown little initiative in resolving conflicts surrounding issues of land ownership. This environment is compounded by a lack of business capacity and skilled labour in the province.

4.4.10. Source of Drinking Water:

142. In Badakhshan province, the primary sources of drinking water comes from nearby streams and are being utilized by households (70%) while well is the source of water for 30% households. There is no centralized or community water system that supplies drinking water to the households. In the Beharak district the access to safe drinking water is 15%. In Eshkashim province, on average only 9% households use safe drinking water. This falls to 4% in the rural area. About 71% households have direct access to their main source of drinking water within their community, but 21% households have to travel for up to an hour to access drinkable water.

4.4.11. Source of Income:

143. Agriculture, livestock, opium, trade and services, manufacturing non-farm labor and remittance are sources of income of the households in Badakhshan province. Agriculture is major income activity and it provides 36% income. Average annual household income in Badakhshan province 180,000 Afghani and that in Eshkashim province is 167,000 Afghani and average expenditure is 165,000 and 160,000 Afghani respectively. According to UN a person earning less than 1 \$ per day is below poverty line. It is found that about 50% of the people live below poverty line.

4.4.12. Education:

144. Ensuring good quality education and equitable access to education and skills are some of the important ways to raise human capital, reduce poverty and facilitate economic growth. The overall literacy rate in Badakhshan province is 27%, however, while nearly two in five men are literate (38%), this is true for just over one in five women (22%). In the population aged between 15 and 24 the situation for men is better with 46.1% literacy, and for women the figure rises to just over a quarter (26.5%). The Kuchi population in the province has particularly low levels of literacy with 5.1% of men and none of women able to read and write. On average 68%

of children between 6 and 13 are enrolled in school. The figure is slightly higher for boys (58%) than for girls (53%). Amongst the Kuchi population, nearly one in eight of boys (14%) and less than one in ten girls (8%) attend school in Badakhshan during the winter months, and the figures are slightly higher during the summer - 15% of boys and 10% of girls.

145. Overall, there are 604 primary and secondary schools in the province catering for 392,001 students. Boys account for 54% of students and 92% of schools are boys' schools. There are 9,295 teachers working in schools in the Badakhshan province, more than a quarter of who are women (28%).

Access to educational services is easier than in many provinces. A guarter of children 146. (25%) have a primary school in their village, while 16% of students must travel between 5-10 kilometres, and 15% must travel more than 10 kilometres to reach their closest primary schools. Secondary schools exist in village for 13% of the population, while 18% of students must travel about 5-10 kilometres, and more than a quarter (28%) must travel more than 10 kilometres to their closest secondary schools. High schools are located in-village for only 7% of the population, while 20% of the students must travel between 5-10 kilometres, and nearly half (48%) must travel more than 10 kilometres to reach their closest high schools Badakhshan province also has a higher education facility. The University of Badakhshan has a faculty of Education and a faculty of Medicine. In 2011 there were 423 students enrolled at the university, 208 men (48%) and 215 women (52%). Of those, 180 students were in their first year, 51 men (64%) and 29 Women (36%). Eighty eight male students live in dormitories provided by the University. There is also a Teacher Training Institute which had 357 students, 41% of whom were men and 59% women. Two hundred and ten new teachers graduated from Badakhshan Teacher Training Institute in 2010, including 80% women and 20% men (Table 4-20).

| | Schools | | | Stud | Students | | Teachers | |
|-------------|---------|------|-------|---------|----------|-------|----------|--|
| | Mixed | Boys | Girls | Boys | Girls | Male | Female | |
| Primary | 144 | 4 | 22 | 139,470 | 128,903 | 1,060 | 204 | |
| Secondary | 170 | 7 | 15 | 51,325 | 40,888 | 2,460 | 603 | |
| High School | 124 | 59 | 59 | 18,839 | 12,576 | 2,900 | 2,068 | |
| Total | 438 | 70 | 96 | 209634 | 182,367 | 6,420 | 2,875 | |
| | | 60 | 604 | | 001 | 9,2 | 95 | |

 Table 4-20:
 Primary School Education In Badakhshan
 Province

Source: CSO/Afghanistan Statistic Yearbook 2010–2011.

4.4.13. Health Services:

147. Ensuring the availability of basic health and hospital services, and developing human resources in the health sector is essential to reduce the incidence of disease, increase life expectancy and enable the whole population to participate in sustainable development. A basic infrastructure of health services exists in Badakhshan province. In 2011 there were 79 health facilities which are consisted from 8 mobile clinic, 21 sub-health center, 35 basic health center, 13 comprehensive health center, one district hospital, and one provincial hospital with a total 150 beds. There were also 176 doctors and 482 nurses employed by the Ministry of Health working in the province, which represented an increase of 488% in the number of doctors and a 567% increase in the number of nurses compared to 2007. The province also has 118 pharmacies of which all are owned privately. The majority of communities do not have a health worker permanently present in their community. More than four fifths of men's shura (89%) and women's shura (82%) reported that there was no community health worker present, and while

the female group most commonly said that they did not know what their closest health facility was, the male group most commonly said that a Basic Health Centre (BHC) or clinic without beds was their closest health facility. Out of 1,851 villages, only 56 have a health centre or dispensary within their boundaries. Access to health care is difficult for many people in the province with one in five people (16%) having to travel more than 5 kilometers to reach their nearest health facility. More than half the population has to travel over 10 kilometers to get medical attention–60% for health centers and 62% for dispensaries.

4.4.14. Social Protection

148. Building the capacities, opportunities and security of extremely poor and vulnerable Afghans through a process of economic empowerment is essential in order to reduce poverty and increase self-reliance. The level of economic hardship in Badakhshan is reasonably high. Around half the households in the province (48%) report having problems satisfying their food needs at least 3–6 times a year, and a further quarter of households (27%) face this problem up to three times a year, as the following table-4.21 shows:

Table 4.21: Problem Satisfying Food Need of the Households during Last Year

| | Never | Rarely(1-3 time) | Sometime | Often few times | Mostly happen | | | |
|---------------|-------|------------------|-------------|-----------------|---------------|--|--|--|
| | | | (3-6 times) | a month) | a lot | | | |
| Household (%) | 10 | 27 | 48 | 9 | 6 | | | |
| | | | | | | | | |

Source: National Risk and Vulnerability Assessment, 2008.

149. Around two people in five in the province (40%) is estimated to receive less than the minimum daily caloric intake necessary to maintain good health, and around three quarters of the population (73%) has low dietary diversity and poor or very poor food consumption as shown as below Table 4.22:

Table 4.22: Food Consumption Classification for all Households

| | Low dietary | / diversity | Better dietar | y diversity |
|-------------------|-------------------------------|-----------------------|-------------------------|----------------------------|
| Households (%) | Very poor food consumption | Poor food consumption | Slightly better food | Better food consumption |
| Rural | 25 | 48 | 19 | 8 |
| Total | 24 | 49 | 17 | 10 |

Source: National Risk and Vulnerability Assessment, 2008.

150. In 2008, 24% of the population of Badakhshan Province received allocations of food aid. In addition, of the 36% of households who reported taking out loans around two thirds (67%) said that the main use of their largest loan was to buy food. A further 11% used the money to cover expenses for health emergencies. In the same year more than half the households in the province (55%) reported feeling that their economic situation had got worse compared to a year ago, and a quarter felt that it had remained the same, as the following Table 4-23 shows:

| Table 4-23: Comparison of Overall Economic Situation Compared to One Year Ago | | | | | |
|---|------------|-------|------|-----------------|-------------|
| | Much worse | Worse | Same | Slightly better | Much better |
| Households (%) | 19 | 38 | 24 | 20 | 1 |

Source: National Risk and Vulnerability Assessment, 2008.

151. In 2008, more than half of all households in the province (57%) report having been negatively affected by some unexpected event in the last year, which was beyond their control. People were most vulnerable to shocks related to natural disasters which affected nearly all households in the province (94%) and agricultural problems which affected around a quarter of households (26%), as the following Table 4-24 shows:

| Type of shocks | Rural | Urban | Average |
|---------------------|-------|-------|---------|
| Drinking water | 6 | - | 5 |
| Agriculture | 23 | - | 25 |
| Natural Resource | 94 | - | 94 |
| Insecurity | 3 | - | 3 |
| Financial | 5 | - | 5 |
| Health or epidemics | 2 | - | 2 |

| Table 4.24: Households Experiencing Shocks in the Provi | nce |
|---|-----|
| (%) | |

Source: National Risk and Vulnerability Assessment, 2008.

4.4.15. Security and Safety

152. Ensuring a legitimate monopoly on force and law enforcement that provides a secure environment for the fulfillment of the rights of all Afghans is essential to ensure freedom of movement for people, commodities and ideas, and to promote social and economic development. Safety issues related to civil unrest and crime are less of a concern in the Project Area than they are in the rest of the country. In terms of traffic safety, traffic volumes are light and current road conditions preclude excessive speeds. Non-motorized traffic (NMT) is encountered in some areas, most frequently in the agricultural areas, but is also relatively light at present. The most significant safety issue is the poor quality of the road and bridges combined with a lack of any safety barriers on any portion of the Project Road. There are many points on the road where the road twists and turns sharply round narrow hairpins perched high above the river. Anecdotal information indicates that accidents are frequent especially in poor weather conditions; this can lead to tailbacks and delays.

4.4.16. Natural Resources:

153. Beharak, Warduj, Zebak, and Eshkashim are one of the poorest, most mountainous, and agriculturally least productive area in the country. Much of the land is barren and inaccessible, small landholdings, extensive food insecurity and poor soil quality characterizing much of the region. The terrain in mainly characterised but scrub and extensive high altitude pasture lands, most of it severely denuded. As with the rest of Afghanistan, excessive use of wood for fuel and fodder combined with years of drought and war has resulted in the destruction of much forestry and rangeland. The over exploitation of various shrubs is resulting in serious soil erosion, flash floods with the smallest amount of rain and possibly resulting in irreversible damage to ecosystem.

4.5. Industries and Minerals

4.5.1 Industries:

154. There is no industrial unit close to the road alignment considered under different options.

4.5.2 Minerals:

155. The project province area has abundant mineral resources including Lapis Lazuli a deep blue gemstone etc. Construction of the Beharak–Eshkashem Road will require the use of certain natural resources and will facilitate the transport of others for use elsewhere. Within Badakhshan semi-precious gem stones and industrial minerals are being inefficiently mined, including Lapis Lazuli a deep blue gemstone. However, no Lapis mines were observed within the Project Corridor.

4.5.3: Quarries and Borrow Pits:

156. The quarries and borrow pits required for construction activities are located in the project area close to the road alignment. The locations of the quarries and borrow pits along the exclusive alignment for Option -3 is given at **Table 4-25**.

| Type of Material | Location | | |
|------------------------|--|--|--|
| Stone Aggregate | Boulder and Hard sound rocks are abundant in the project road, at KM 20+200, KM 29+300, KM 57+340 and 62+700 etc. | | |
| Gravel | Gravels are available in plenty in Warduj River Basin, Particularly at KM 74+000, Amu Darya River at Eshkashim | | |
| Sub-base Material | KM 25+500, KM 26+450, KM 66+700- KM 67+620 | | |
| Embankment Material | KM 64+900 and KM 69+500 | | |
| Sand | Sand is available in Wijling River Basin at KM 85+800 and KM 108+000; also near Warduj River Basin at KM 19+000, KM 33+000 and KM 45+000 | | |

Table 4-25: Source of Construction Materials

CHAPTER-5 ENVIRONMENT IMPACT AND MITIGATION MEASURES

5.1 General:

157. Upgrading and Rehabilitation of the road connecting Beharak to Eshkashim covers a distance of about 108 km under study. The alignments under study mostly follow existing gravel road alignment. This road will be reconstructed/ upgraded to facilitate traffic movement to cross country trade and import causing minimum disturbances to the community. The community will be benefited greatly by the use of this road. As discussed earlier, the major activities involved with this project are: re-construction/up gradation of existing road, paving of the road, construction of cross drainage structures and bridges over the rivers and large channels. Potential Environmental Impacts have been identified using ADB guidelines for "B" category project.

5.2. Impact on Physical Environment

5.2.1 Pre-construction Period

5.2.1.1 Land Acquisition:

158. About 123.98 ha of privately owned or operated land will be required for road alignment.

159. In order to minimise land acquisition, the alignment of road, acquisition of human habitation or culturable land has been avoided as far as feasible.

5.2.1.2 Route Survey and Associated Activities:

160. The alignment is mostly in uninhabited area. Only small part goes through habitation and a small part goes past a mining area. The survey activity is only for short time and the populace is not likely to be affected by the activities. However, the workers will be appraised to behave in a congenial manner in keeping with the culture of the community.

5.3 Construction Period

5.3.1 Soil Borrowing and Carriage of Materials

161. The main impacts on land during construction are from (i) spoils due to clearing of land for site preparation (ii) extraction of fill materials from cut section, and/or borrow pits (iii) excess cut from the landslide areas (iv) conversion of the existing land uses such as agriculture and grassland to stockpile of materials (v) soil erosion in mountainous slope, side slope, borrow pits and un-compacted embankments (vi) excess rocks from the mountain scaling and (vii) contamination of the land from hazardous and toxic chemicals and construction material spillage viii) use of agricultural land for transportation of materials.

162. Uncontrolled sourcing of materials could lead to environmental impacts such as the loss of topsoil or the disfigurements of the landscape from borrow pits. Earthen embankments and material stockpiles will be susceptible to erosion, particularly during the rains and re-suspension of dust during the dry seasons. During construction, the volume of cut and fill (soil) are estimated to be approximately 2,710,768 m³ and 2,372,887 m³ respectively. There will be about 337,881 m³ excess cut, which will be disposed of in the selected sites. The huge amounts of excess cuts are due to hill cutting and realignment at some mountainous sections.

163. As mitigation measure excess cut will be used to shape the embankment side slopes, strengthening the toe of the high slopes road bench and filling the low lying government lands and for plantation in pre-selected areas, approved by NEPA and PMU. Mass balancing procedure will be followed as far as possible. To avoid the transportation of the excess cut to over long distances, it will also be used for construction of lay bys at the mountainous sections adjacent to the main road. The lay bys will be used by travelers to stop vehicles temporarily to take rest or to watch natural scenery. Contractors will submit a spoil disposal plan to PMU for approval. The spoil disposal plan should show the location of borrow pits to be used and fill location for excess cut and the measures to be taken to rehabilitate these pits and cuts upon finalization of the Project. PMU will approve and monitor this plan. Existing road alignment, where there is rich cultivable land, will only be used.

164. In order to reduce impact on all borrow sites, contractors will ensure that they acquire appropriate environmental permits from NEPA before sourcing the material, including watering of the local earth roads close to the settlements used by the borrow trucks. Contractors will be discouraged from using productive agricultural land as source of borrow materials and where this cannot be avoided, shall minimize the use and restore these to their original state after completion of civil works. Embankments should be monitored during construction for signs of erosion; long-term material stockpiles will be covered to prevent wind erosion. The contractor will develop crossing spots for allowing unhindered passage of existing traffic.

165. The chemicals and explosives used shall be stored at safe storage area properly guarded ensuring all necessary safety. All explosives and chemicals received at store yard and dispatched to worksite will be properly inventoried. Such material will be transported under safe custody and safe vehicles.

5.3.2 Rock Blasting:

166. The impacts of rock blasting $(503,326 \text{ m}^3)$ are creation of noise and vibration and displacement of rocks and spreading in adjacent area and at times rolling down hills. The blasting areas are not very close to human habitation. The following mitigation measures will be undertaken to avoid adverse impact.

- i. The explosives will stored in safe magazine away from habitation area
- ii. The entry of explosives and dispatch to worksite will be properly recorded and monitored according to pre-designed schedule
- iii. Prior to undertaking any blasting an assessment of the area will be carried out to identify if there is any habitation likely to be affected.
- iv. Evacuate the population living in the risk zone and pay compensation for relocation and loss of work time.
- v. Undertake "controlled blasting" so that earth and rock-wastes from blasting could be controlled and eventually disposed at an environmentally safe location
- vi. The contractor will be under obligation of submit a plan identifying where the blasted waste (rock and earth) will be disposed. The area should not be located nearby any water body, agriculture land, and down slope of the road that will trigger unstable slopes
- vii. Blasting will be carried out if other less invasive methods could not be used
- viii. Living creatures and equipment are to be kept at safe distance from work site, especially on the rolling side.

5.3.3 Slope Cutting and Stabilisation

167. There are a number of stiff cliffs along the alignment. These are potential points of land slide and rock fall. In addition, land slide may occur in soft rock and soil covered area. Rockslides and landslides will be prevented by cutting slopes at only 45[°] with approximate spaced branches. Any cut and fill that result in a slope steeper than 45[°] will need to be secured by a protective wall and protected by bioengineering methods.

168. For a long term solution to the slope stability problem, it is crucial that land degradation is stopped. Maintaining a vegetative cover on agricultural land in the mountain area would reduce erosion through run-offs, land and mud slides. It would also help ensure an efficient and reliable supply of water for irrigation to the valleys. The IEE recommends planting trees and landscaping along the corridor and the service of a local NGO may be sought.

169. The road in high altitude and other mountainous sections are susceptible to snow fall and requires winter maintenance. Pavements, like all other materials, will expand as they rise in temperature and contract as they fall in temperature. Small amounts of expansion and contraction are typically accommodated without excessive damage, however extreme temperature variations can lead to development of cracks. The road design considered sound engineering practices, such as contraction and expansion joints, air entrainments, so that it will function steadily during the warmest and coldest temperature of the year. The temperatures in the project area vary from -10° C to $+35^{\circ}$ C.

170. Therefore, MPW should schedule a regular maintenance program during warm weather (i.e., late spring, summer, early fall), when damages to the pavement damages may be repaired. The public may also be encouraged to report any faulty pavement structures, culverts and road surfaces to MPW in an appropriate manner in order to make the government aware of the further maintenance procedures to be made. The MPW can also hire local groups for snow plowing during heavy snowfall.

5.3.4 Noise and Vibration:

171. The operation of plant and equipment during the construction of the road will generate noise and vibration. Materials for the construction for the road will be bought to site by truck or dumpers. Truck movements have the potential to generate significant noise and vibration, particularly when passing through villages and towns. In order to prevent excessive noise and vibration the trucks and rolling equipment must move at permissible limit and these must avoid unnecessary hooting.

172. There are some villages along the route e.g Arder, Adam Beki, Chapak Sarrk, Poshusstan, Oshkhan, Murkhan etc. in Beharak District; Azakhcha, Passebagh, Eshtakhan, Wakhiani, Chakaran, Ghanew, Umowl, Ekshire, Kosang, Sufian, Tirgaran, Kazdai etc. in Warduj District; Gulkhana, Dasthe Khan, Zarkhan, Dandzebok etc. in Zebak District; Ujling, Bazgir, Kangarak, Teshken, Kushpak, Wahdatabad, Eshkashim, Nechem, Qasdae, Saeyad, Sukumal and Darwand in Eshkashim District. Noise from the traffic is the major noise source during the day which is significantly reduced at night. During the construction phase there will be significant increase in movement of construction vehicles. The contractor will be required to liaise regularly with the community and in the event that there are night time noise impacts the contractor will be required to limit construction activities to the hours of 7am to 7pm. Construction equipment producing excessive noise during school hours should be avoided as much as possible.

Creation a buffer zone between the school/residential areas and construction site to reduce disturbance to normal schooling/residential activities is strongly recommended.

5.4 Water Impacts

5. 4.1 Surface Water:

173. The Project road crosses Warduj and Wijling Rivers and several small channels. A number of new bridges and culverts are to be constructed and existing bridges and culverts are to be widened. In terms of water quality, the Project may increase silt load during construction at bridge and culvert sites. Embankments and construction materials (fill, sand, and gravel) are subject to wash out with rainwater. There is the potential for hydrocarbon leakage and spills from storage and mixing plants; discharge of sewerage from work camps to the water resources or percolation through seepage and contamination of the local water table. The stream waters in the Project areas will also be used for construction works.

- 174. To mitigate this:
 - i. Bridges and culverts will be rehabilitated and installations of small drainage structures are proposed in the engineering design. In sections with streams, earths and stones will be disposed properly so that they do not block rivers and streams
 - ii. Open surface will be covered by grasses and creepers to reduce wash-away of material
 - iii. Fuels for running of equipment will be stored in secure, impermeable and bounded compounds away from surface waters and all contaminated soil will be properly handled according to NEPA or other acceptable standards. As a minimum, these areas will be maintained in such a way that any spills can be immediately contained and cleaned up. Prior to initiating the work, the contractor will meet with the PMO to determine the proper location of mixing areas and the handling and management of any such spills. Any petroleum products used in the preparation of bitumen mixes must also be carefully managed to avoid spills and contamination of the local water table
 - iv. Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and contractors will submit a simple sewage management plan to PMO
 - v. Cofferdams, fences, sediment barriers or other devices are included in the design to prevent migration of silt during excavation and boring operations within streams. Dewatering and cleaning of cofferdams will be performed to prevent siltation by pumping from cofferdams to a settling basin or a containment unit. In bridge demolition sites, efforts will be made to avoid "dropping the bridge" into rivers/streams. This will be done by "sawing" appropriate sections of the bridge and using cranes to lift these sections away, or alternatively by construction of a platform onto which the bridge could be dropped;
 - vi. Discharge of sediment-laden construction water (e.g., from areas containing dredged spoil) directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge and
 - vii. Drainage system will be periodically cleared so as to ensure adequate storm water flow. Local community under contract from MPW will be responsible for

cleaning the drainage facilities especially clearing the clogging of drains, cutting of grasses, and clearing the shrubs

5. 4.2 Groundwater:

175. Use of groundwater will be limited and may be used in camps for use of staff. The quantity will be negligible to warrant any attention.

176. The groundwater quality in the Warduj and Wijling watershed is unknown. However, given the lack of industrial activity within the region and the relatively sparse population living on its banks it is assumed that the water quality is good. Notwithstanding the above, it is noticeable that in the larger urban clusters such as Beharak and Eshkashim a significant quantity of domestic waste is proposed of directly into the river, thus localized high pollution levels are probably evident in the river close to these towns.

5. 4.3 Air Quality Impacts

177. During construction, air quality is likely to be degraded by exhaust emissions from the operation of construction machinery; fugitive emissions from asphalt and concrete plants and dust generation and re-suspension from haul roads, unpaved roads, exposed soils and material stock piles.

178. The production of concrete and asphalt and their usage during road surfacing will emit greenhouse gases such as Non-Methane Volatile Organic Compounds (NMVOCs).

- 179. In order to mitigate these, the following will be implemented:
 - i. Construction equipment will be inspected and certified as roadworthy by a third party and will be maintained to a good standard. Idling of engines will be discouraged while on the project site. Machinery causing excessive pollution (e.g., visible smoke) will be banned from construction sites.
 - ii. The contractor will submit a dust suppression program to PMO prior to construction. The detail action plan will be taken to minimize dust generation (e.g., spraying of roads with water, vegetation cover in borrow sites), and will identify equipment to be used.
 - iii. Construction materials will be stored away from the watercourses; soak pits will be provided to contain accidental spills.
 - iv. The batch, concrete and asphalt plants will be located minimum 1 km away from the settlements to avoid direct impact of emissions and dusts on local settlements.

5. 4.4 Impact on Flora, Fauna and Ecosystem

180. There is no ecological sensitive area along the project alignment and thus there will be no encroachment on such resources. Some plantation/vegetation would require to be cut for the construction of the road. None of the floral species required to be cut or cleaned are endangered or rare. However, the abundance will be adversely affected. But these will be replenished through plantation. Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done. The numbers of trees likely to be cut along the alignment under different option studied are given in Table 5-1:

Table 5-1: Numbers of Trees Likely to be cut Along the Alignment under Different Locations

| Name of Trees Scientific name | | Number of Trees | Remarks |
|-------------------------------|------------------|-----------------|------------------------|
| Senjid | Oleaster | About 500 | |
| Henbane | Hyoscyamus niger | About 1100 | |
| White Mulberries | Toot sefid | About 1500 | |
| White poplar | Populus alba | About 5000 | More trees need be cut |
| Walnut | Juglans | About 2500 | |
| Maple | Acer saccharinum | About 1000 | |

181. Trees to be cut by the project would be used for boundary fencing for plantation area, tree protection structures, tree plantation support like wood stick, and domestic uses like furniture making and other uses.

182. Plantation will be carried out at the different section of road alignment, river bank and camp site areas and subsequent maintenance of two years. During plantation program, local species of plants will be given preferences. Periodic cleaning; manuring and watering will be done for healthy growth of trees with proper fencing and guarding of trees. Plantation area will be fenced to protect from cattle menace. Potential plantation areas in the alignment are as be below:

183. Arder–Awar (KM 3+000–KM 20+000), Zu–Ekshire (KM 24+000–KM 27+000), Sufian (KM 36+000–KM 37+000), Tirgaran–Kazdai (KM 46+000–KM 48+000), Abdew (KM 61+000–KM 61+500), Dagkhana (KM 79+000–KM 80+000), Bazgir–Kangarak (KM 95+000–KM 98+000) and Eshkashim–Sukumal (KM 103+000–KM 107+000)

184. The fauna resources are very limited as shown earlier. Illegal poaching by construction workers may cause short-term impact on wild / domestic animal (fauna); but such activities would not be permitted and strict measures will be taken to curb such undesirable activity.

5.4.5 Impacts on Cultural Properties:

185. There is no place of archaeological, paleontological, historical, architectural, aesthetic or other cultural significance in the vicinity of project road alignment studied. The project will not encroach on any cultural properties and no impact on cultural properties is expected. However, the EMP comprises guidelines for Chance Find Procedures according to national law (see Annexure 2-Protection of Cultural Property) and will take necessary action accordingly (if any).

5.4.6 Impacts on Common Property Resources:

186. Common property resources are those properties owned by the community for common use by all such as public well, water tank, play ground, common grassing ground, community buildings etc. The project will have no impact on such properties.

5.4.7 Health, Safety and Hygiene: Construction Period:

187. The construction sites may have limited public health impacts if waste water is allowed to form cess pool or pollute water body, solid wastes are littered, spoil earth blocks water or local passage, undue mixing with community etc.

188. As a condition of contract, the contractors will ensure that no wastewater is discharged to local water bodies or form stagnant pools, landfills do not block passage or water way, solid wastes are disposed at designated location, the workers maintain congenial social behavior. The camps will be supplied with safe drinking water and water for daily use. The camps will have proper sanitation system for disposal was black and grey water.

189. Contractor will therefore be required to recruit an environmental, health and safety manager to address such concerns at the work sites and liaise/work with the workers. He will be a liaison between the community and the working personnel.

190. Natural disaster: It may happen in the form of earth quake, fire, flood etc. any time. As mitigation measure the work sites will have emergency spot for refuge during earth quake. The camps will be made at a height above flood level; fire drills will be undertaken at camps to ensure proper use of gadgets kept in each camp.

5.4.8 Hazardous Materials & Waste Management:

191. During the construction period a wide range and substantial volumes of waste may be generated including gravel, concrete, bituminous wastes etc. Debris from demolition of old undersized culverts will be created. Poles and cables, steel, organic material, such as cleared vegetation, timber and soil will be accumulated in camp and work site. In addition there will be oils, fuel, grease and chemicals from plant, equipment and vehicle servicing. Any hazardous materials that are used will also need to be stored and handled carefully to prevent spills and pollution. The following hazardous materials and waste management measures will be implemented during the construction period:

- i. all areas designated for the storage of fuels, oils, chemicals or other hazardous liquids shall have a compacted base and be surrounded by a bund to contain any spillage,
- ii. These areas shall be covered by a roof structure to avoid contamination of rainwater. Alternatively ventilated containers and individual spill pallets could be used, dependent on the volume of hazardous materials;
- iii. Areas designed for the storage of hazardous materials are to be clearly designated and storage of such materials outside these areas strictly prohibited.
- iv. An Emergency Spills Contingency Plan shall be prepared as part of the Contractors Environmental Management Plan.
- v. apply any waste minimization and management strategies as nominated;
- vi. dispose of waste to nominated project disposal sites;
- vii. ensure that the waste management measures are implemented on the project site;
- viii. prepare and implement a hazardous waste management plan for the disposal of waste oil, batteries and other hazardous materials;
- ix. ensure that topsoil is stockpiled for use in post construction landscaping;
- x. chip and mulch vegetation cleared and reuse it as an organic base for revegetation; ensure that materials, which may cause land/water contamination or create odour problems, are not disposed of on the site;
- xi. keep work areas tidy;
- xii. ensure that there is the adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes; and

xiii. Ensure adequate toilet and ablution facilities are provided for the duration of the contract.

5.4.9 Quarries and Borrowing of Materials:

192. The quarrying and borrow materials may affect the land quality of adjacent area, may affect landscape, may harm resources, may cause erosion etc.

193. In order to mitigate adverse effects, the quarrying should made under an approved plan and approved design to conform to landscape, quarrying from adjacent agricultural land is to avoided and proper approval of ministry of Mines are to be taken.

5.5 Operation Period

5.5.1 Air Quality:

194. The number of vehicles operating will increase many fold. Diesel engines will be used to power the buses/trucks and so there will be some emissions from the engines. But vehicles with proper fitness will be allowed to run on the road. So, the exhaust emission from the vehicles will be limited and the prevailing wind will quickly disperse the emissions to acceptable levels before that can reach habitation area. Due to smooth pavement surface and permissible grade in the design of road the use of gas per Km per vehicle will be significantly reduced.

5.5.2 Noise and Vibration:

195. The noise and vibration impacts during operation are only from vehicle movement. The noise and vibration generated from vehicles on dirt road is significantly higher than that on the paved road. So, the noise and vibration on a firmly build road will be lesser in magnitude than that is now felt.

5.5.3 Accidents:

196. Due to many fold increase in traffic the chances of accidents is also likely to rise. Accidents may lead loss and impairment of human beings and other living creatures. In case of accidents of vehicles with oil and hazardous material soil may be contaminated and so water if it gets chance set into the source. Mitigation measures will put stress on prevention rather than rectification. Steps to be taken include: Awareness of the community in road use, limiting speed in habitation area, training and awareness creation among drivers, Special arrangement for vehicles carrying hazardous material etc.

5.6. Auxiliary Benefit:

197. The up-gradation/reconstruction of the road project, will be giving auxiliary benefits those, cannot be assessed fully in monetary values. These are described below:

i. **Employment:** Some employment opportunity will be created in the road construction work during implementation phase. Employment in transport sector will increase in operation phase. Improved marketing of agricultural products will increase employment in agriculture and processing industry. Other secondary employment opportunities will be created.
- ii. **Health and Nutrition:** Due to the implementation of the project, people of the area will get benefit from trade sector thus will earn more than present; this will enable them to invest more in health care. Due to increase in per capita income on production it is likely to enhance nutrition level.
- iii. The project will ensure proper hygienic condition in camps and work places. This would increase health and hygiene awareness among the local people. Health centres would be within easy reach along the road. Thus the project will have tremendous positive effect on health hygiene and occurrence of disease is likely to decrease
- iv. **Sanitation:** The sanitation facility of the area will be increased due to the improved level of income and awareness growing on sanitation. The economic value in this head cannot be measured.
- v. **Education:** The country is large with institutions dispersed through large area. Improved communication will allow students and teachers to come to school. Improved communication of education behaviour change materials can be taken to remote area. Thus the education level is likely to increase.
- vi. **Women Status:** Household income is likely to increase from employment, trade and other sources. Better educational opportunities and higher household income would improve the status of women in the project area. Products in house by women may be suitably marketed and hence the women status will be improved.

CHAPTER-6: INSTITUTIONAL REQUIREMENT OF ENVIRONMENT MONITORING PROGRAM

6.1. Institutional Framework for Environmental Management:

198. Institutions responsible for executing and monitoring the environmental aspects of this Project are:

- i. MPW is responsible for planning, constructing, operating and maintaining the road infrastructure of the Beharak to Eshkashim Road Project in Afghanistan. The Project Management Unit (PMU) will be in charge of project management to ensure that the contract provisions are properly maintained. Both the Implementation Consultants and the PMU are responsible for environmental monitoring and management of project implementation.
- ii. All type of civil works will be constructed by the contractor to be appointed
- iii. The MPW and its authorities will also undertake routine and random monitoring of specific environmental plans addressed in this IEE.
- iv. The Project will provide PMU with the assistance of a construction implementation consultant (CIC) to help ensure the implementation of environmental management practices at each stage of the construction and operation.
- v. The Ecological Section of the Ministry will be consulted if complicated issues arise during construction and operation stages.
- vi. An Environment Specialist can be appointed by the PMU so that he can oversee and can monitor the environmental issues.

199. Implementation and monitoring of mitigation measures as per the Environmental Monitoring and Management Plan during the construction stage will be the responsibility of the contractor. The environmental specialists will supervise the monitoring of implementing mitigation measures during construction. The national environmental specialist will coordinate with the international environmental specialist for resolving complicated issues that arise in the field and to provide continuously updated information in order to submit reports to PMU and ADB.

200. After project completion, it is likely that operation and maintenance of the road will be undertaken by MPW Officials and they will also be responsible for the development and implementation of the monitoring plan for the operational phase.

6.2. Environmental Monitoring Program:

201. Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the protection of environment.

6.2.1 Aspects to be monitored are as follows:

- i. **Pre-project Documentation:** Inclusion of environmental clauses in bid and contract documents.
- ii. **Construction Period:** Environmental performance of contractors with regard to control measures pertaining to material storage, location of work camp, noise,

waste disposal, worker's safety etc. which should be monitored by the Construction Supervision Consultant (CSC) to be appointed by the MPW.

iii. **Operation and Maintenance (O&M):** O&M practices and environmental effects including, de-siltation process, materials handling, soil contamination, noise and air quality etc.

202. The Construction Implementation Consultant (CIC) in cooperation with PMU during project implementation will supervise the environmental monitoring regularly and submit quarterly reports based on the monitoring data. The PMU shall submit the following environmental reporting documentation to MPW/ADB:

6.2.2 Environmental Monitoring Reports:

203. The environmental monitoring reports will include environmental mitigation measures undertaken, environmental monitoring activities undertaken and details of monitoring data collected, analysis of monitoring results, recommended mitigation measures, conduct environmental training, and environmental regulatory violations. The environmental monitoring reports will be submitted to MPW/ADB twice annually during the construction period and twice annually for one year after completion of construction.

6.3. Environmental Management Costs:

204. The management and monitoring will continue, until the construction work is closed. Environmental management cost includes tree plantation on the road side.

205. Tentative cost of environmental management may be as follows:

i. Plantation of Tree

= \$ 216,815.00

(Cost of Tree = \$102,000.00 (\$2/Tree) and subsequent maintenance cost for two years approximately \$114,815.00; Note: For every 2 meters of both side of the road and proposed for 30 km of road for Tree plantation).

| ii. | Environment Training to the Relevant People | = \$ | 70,000.00 |
|------|---|------|------------|
| iii. | Checking of Constructed Road | = \$ | 100,000.00 |
| iv. | Checking for Maintenance for Quality | = \$ | 200,000.00 |

Total = \$ 370,000.00

206. So, a total \$216,815.00 for tree plantation and \$370,000.00 for road maintenance, training, etc. Cost, in total 586,815.00 USD is required for tree plantation and road maintenance, training, etc.

207. A detailed tree plantation plan needs to be prepared during the design review and continued environmental monitoring should be carried out. A tentative tree plantation budget can be seen in Table-6.1 below:

| S/N | Items | Unit | Quantity | Unit Cost | No. of | Total cost | | |
|--------------------------------|-----------------------------------|--------|----------|---------------------|----------------------|------------|--|--|
| Α | Staff Remuneration | | - | (\$) | Unit | (\$) | | |
| 1. | Horticulturist | Months | 1 | 1,00 | 0 4 | 4,000 | | |
| 2. | Supervisor | Months | 30 | 50 | 0 2 | 30,000 | | |
| 3. | Skilled labor | Months | 30 | 30 | 0 3 | 27,000 | | |
| 4. | Unskilled | Months | 300 | 10 | 0 3 | 9,000 | | |
| 5. | Guard | Months | 2 | 2 30 | 0 4 | 2,400 | | |
| Sub-T | Sub-Total Remuneration of Staff A | | | | | | | |
| В | Material Cost | | | | | | | |
| S/N | Items | Unit | Quantity | Unit Cost in USD | Total cost in USD | Remarks | | |
| 1. | Pain Sapling/Senjid | No | 3,000 | 2 | 6,000 | | | |
| 2. | Willow Sapling/ Henbane | No | 5,000 | 2 | 10,000 | | | |
| 3. | Mulberry Sapling | No | 10,000 | 2 | 20,000 | | | |
| 4. | White Poplar | No | 20,000 | 2 | 40,000 | | | |
| 5. | Maple | No | 3,000 | 2 | 6,000 | | | |
| <u>6</u> . | Walnut | No | 10,000 | 2 | 20,000 | | | |
| 7. | Tree Plant Cutting | No | 4,000 | 1 | 4,000 | | | |
| 8. | Fanzines sapling | No | 6000 | 1 | 6,000 | | | |
| 9. | Pickaxe | Unit | 5 | 5 | 25 | | | |
| 10. | Shovel | Unit | 60 | 4 | 240 | | | |
| 11. | Wheel barrow | Unit | 20 | 40 | 800 | | | |
| 12. | Tape (L) | Unit | 60 | 5 | 300 | | | |
| 13. | Cutting tools | Unit | 20 | 6 | 120 | | | |
| 14. | Lime | K/g | 200 | 0.5 | 100 | | | |
| 15. | Animal Manure | M/t | 50 | 20 | 1,000 | | | |
| 16. | Water Pump | Pcs | 3 | 900 | 2,700 | | | |
| 17. | Fertile Soil | M/t | 35 | 10 | 350 | | | |
| 18. | Water Pot | Unit | 60 | 3 | 180 | | | |
| 19. | Working gloves | Pairs | 300 | 1.5 | 450 | | | |
| 20. | Fungicide | K/g | 200 | 2.5 | 500 | | | |
| 21. | Polyethylen Bag | K/g | 100 | 0.5 | 50 | | | |
| 22. | Fuel For Water pump | Ltr | 1,500 | 1 | 1,500 | | | |
| 23. | Empty bag | NO | 500 | 1 | 500 | | | |
| 24. | Hand Light | NO | 30 | 1 | 30 | | | |
| 25. | Rope | IM | 7000 | 0.2 | 1400 | | | |
| 26. | | NO | 1 | 60 | 420 | | | |
| 27. | | NO | 10 | 25 | 250 | | | |
| 20. Sub T | VV000 Stick | NO | 50,000 | 0.3 | 15,000 | | | |
| | Otal of Material Cost B | | | | 124,415.00 | | | |
| C S/N | | Unit | 0 | Unit Cost | Total Coat | Domarka | | |
| 5/N | T | Unit | Qua | in USD | in USD | Remarks | | |
| 1. | I ransportation | Load | 50 | 100 | 5,000 | | | |
| 2. | Kent for Vehicle | | 5 | 1,000 | 5,000 | | | |
| 3. | | Ltr | 2 | 1,000 | 2,000 | | | |
| 4. | Rent for water tanker | | 5 | 1,000 | 5,000 | | | |
| 5. | Miscellaneous Cost | | | | 3,000 | | | |
| Sub To | otal of Operation C | | | | 20,000.00 | | | |
| Grand Total (A+B+C) 216,815.00 | | | | | | | | |

Table -6.1: Budget for Tree Plantation Program

*A total of two hundred sixteen thousand and eight hundred fifteen only is required for tree plantation.

208. The Project regards roadside trees as being highly desirable and integral to the rural landscape, providing a range of social, environmental and economic advantages. As such they are considered to be a primary part of the public landscape amenity affecting and benefiting all residents within a locality.

209. Economic Benefits: Property values are increased by the presence of trees by creating a "leafy suburb".

210. Social Benefits:

- i. Aesthetically, trees make an important contribution to the character or amenity of the local area and form a notable visual element in the landscape.
- ii. Trees improve our quality of life by providing a sense of peacefulness, restfulness, serenity and tranquillity as a result of creating a more natural and less artificial environment.

211. Environmental Benefits

Trees:

- i. Purify the air.
- ii. Screen objectionable views.
- iii. Soften the built environment.
- iv. Create a habitat for birds and other wildlife.
- v. Reduce glare from street lamps and car headlights.
- vi. Modify the wind and reduce the damaging effect of strong gales.
- vii. Have a cooling effect in summer by reducing the amount of heat radiated from pavements and buildings.

CHAPTER-7: PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.0: Public Consultation and Information Disclosure:

7.1 Introduction:

212. Public consultation has been carried out in this Project with the objectives of minimising probable adverse impacts of the project through alternate design solutions (alignment and cross-sectional) and to achieve speedy implementation of the project through bringing awareness amongst the community on the benefits of the project. The public consultation has been taken up as an integral part of social and environmental assessment process for this project. To ensure the peoples' participation in the planning phase of this project and treating public consultation and participation as a continuous process, numerous events were carried out at this stage of project preparation.

7.2 Purpose:

- 213. The purpose of the public consultation includes the following:
 - i. To ascertain the public views on various environmental issues related to road improvement project
 - ii. To encourage and provide for people's participation in project design and development
 - iii. To obtain new insight and site specific information and to appropriating possible mitigation measures based on local knowledge of the community

7.3 Objectives of the Public Consultation:

- 214. The objectives of the public consultations are discussed below:
 - i. To promote public awareness about the proposed project especially amongst the potentially impacted Community/individuals.
 - ii. To educate the individuals/interested groups about the proposed course of action
 - iii. To solicit the views of affected Community/individuals on environmental components and the significance of impacts;
 - iv. To serve as an important tool for collecting information about natural and the human environments, much of which would never be accessible through more traditional approaches of data collection
 - v. To ensure lessening of public resistance to modify the proposed activity, by involving them in the decision making process; and
 - vi. To achieve the basis for an Environment Management Plan for the project, with the incorporation of felt needs views and preferences of the people likely to be impacted
 - vii. To inform Project Affected community about the provision of EMP and to settle their felt need with mutual consent and to assist them during relocation of community property, if any
 - viii. Deduce information from the people about the local environmental issues and their dependence upon them
 - ix. Collect peoples' perceptions about the project and how the negative effects of the project should be mitigated

- x. To solicit the views of affected Community/individuals on environmental and social problems
- xi. Receive suggestions from the affected Community with regard to the preferences and options about the project in general and avoidance measures, mitigation/ compensation measures, and benefits being provided, in particular
- xii. To ensure lessening of public resistance to change by providing them a platform in the decision making process

215. Thus, constructive participation by the affected population can influence not only environmental impact of the project corridor, but also the costs, success and duration of the main investment project itself. The possibility of active participation by affected community, NGOs and local government staff varies by project and stage of the project.

7.4 **Process Adopted:**

216. Public consultation is an integral part of IEE study, as per the requirements of ADB's Environmental Assessment Guidelines of 2003 and Safeguard Policy Statement 2009. Public consultations were started at the early stage of EA process while carrying out the survey and investigation works, that is, while environmental screening and prioritization was undertaken. Local community, which is primary stakeholder on environmental aspects, was chosen for consultation (Picture-5 and 6). Besides, local officials and people's representatives were consulted for their suggestion on project design and development. Focus group discussion was adopted as a tool for the public consultation. Seven consultations were conducted at different places of Beharak, Warduj and Eshkashim districts. The environmental and social concerns and suggestions made by the participants were discussed and solved. Table –7.1 indicates the date and place of the public consultation meetings including the number of participants present at each meeting.

| SI. No. | Date | Places | No. of Participants |
|---------|---------------|---|------------------------|
| 1 | Sep. 4, 2014 | Beharak Bazar, Beharak | 11 |
| 2 | Sep. 07, 2014 | Governor Office, Eshkashim | 14 |
| 3 | Sep. 07, 2014 | Eshkashim Bazar | 10 |
| 4 | Sep. 25, 2014 | Governor Office, Beharak | 09 |
| 5 | Sep. 15, 2014 | Teacher Training Center, Murkhan, Warduj | 07 |
| 6 | Sep. 15, 2014 | Governor Office, Warduj | 07 |
| 7 | Sep. 15, 2014 | Ghanew, Warduj | 40 |

| Table-7.1. Public Consultation Meetings including the Number of Participants | Table–7.1: Public | Consultation | Meetings | Including | the Number | of Participants |
|--|-------------------|--------------|----------|-----------|------------|-----------------|
|--|-------------------|--------------|----------|-----------|------------|-----------------|



Picture-5 and 6: Public Consultation at the project area (Ghanew, Warduj)



Picture-7 and 8: Public Consultation at the project area (Beharak)

7.5 Outcome and Action Taken:

217. Local community, officials and NGOs are aware of the proposed road project and they welcomed the project and requested for early completion. People are sure about their more opportunities due to this project, especially through direct engagement during construction. People living along the road have suggested that generation of dust should be minimized during construction and use of fertile agriculture land for borrowing construction material should be avoided. The suggested measures are incorporated in report.

218. The public of Beharak to Eshkashim Road area welcomed the project and told that the project will enhance their road communication facilities thus will increase their business facilities, will decrease time for their office going, and will increase better communication with major cities including Faizabad, Keshim, Kunduz, Kabul, Mazar-e-Sharif etc. The original sign-in sheet of participants and the translated list of participants with date and place of consultations are appended in Annexure 3. A summary these consultations and the participants' comments and opinions are presented in Table 7-2.

Table 7-2: Public Consultations and Focused Group Discussions

| Issues | Participants' Opinion, Comments, and Suggestions |
|-------------------------------------|--|
| General perception about the | Most of the participants are in favor of the project and are |
| project and the awareness about | aware about the proposed project since there have been |
| the proposed project. | initial consultations going on the project areas for a long |
| | time. |
| Support of local people for the | Almost everybody said that they will support the project |
| proposed project? | and also they will render their services for keeping the |
| | security issue safe and intact during the project planning |
| | as well as during the implementation. |
| Any critical issue or concern by | Most participants want the project to be done as soon as |
| the local people regarding the | possible without any corruption from the higher |
| project? | government officials. |
| Any criteria you would like to see | Engineers should design the bridges and culverts in |
| considered during project design, | accordance with good engineering practices so as to |
| construction and operation | improve water flow. Most people believed that Consultants |
| stage? | and Contractors from the past use smaller culverts and |
| | that had resulted in the damage of structures. |
| Do you have any problem due to | The existing paved road is narrow gravel road and does |
| the existing road? | not have any immediate access to the main road. People |
| | face problems for availing adequate transport facilities and |
| | they spend a lot of time for travelling as well as money. |
| What is the usual mode of | People usually travel by the road. Most of the people take |
| transport and how much time do | the public transport and very few people have their own |
| you spend for reaching Kabul? | transport facilities like car and motor cycle. |
| How is the Frequency of Public | There are no government transport facilities. |
| Transport? | |
| What is the average monthly | The average monthly income in this area is Afs 6,000 to |
| Income | Afs 15,000. |
| How much money do you spend | Most of the people interviewed spend around Afs 500 to |
| per month on Transport | Afs 3,000 for the transport. |
| Do you sell your agricultural | They usually transport the product by the public transport |
| product in the market, if yes, How | in case they have to sell out of the local area. Badakhshan |
| do you transport them? How | is the major markets for agricultural products. They usually |
| much money is spent on | spend 15% of the total agricultural expenditure on |
| transportation out of your total | transportation of the agricultural product. |
| expenditure in agriculture | |
| Will you be willing to pay road tax | Most of the people are in favor of paying the toll if it is |
| if the road is built in a good way? | small in amount. However, toll is not a usual practice in |
| | Afghanistan and therefore, some of the people expressed |
| | their unwillingness and inability to pay the toll. |
| Is the proposed project going to | All the participants opined that the proposed road project |
| reduce accidents and provide | will facilitate better traffic system. However, accidents |
| better traffic system? | might increase if proper engineering solutions are not |
| | made in the engineering design, like speed breakers, road |
| | sign etc. |
| What are the numbers of shops/ | Around 80 shops are found in Warduj and about 45 in |
| commercial establishments in the | Zebak. No industrial unit is known to available in the |
| surrounding area? Is there any | project area |

| Issues | Participants' Opinion, Comments, and Suggestions |
|---|--|
| industrial unit in the project area? | |
| General socio-economic Condition: What are the economic activities, land use, cropping pattern (Seasonal), types of crops, value of the crops and average land holding size etc. | The general socio-economic condition of the project vicinity area is agriculture and small commercial activities like shops. Most correspondents are farmers that do not have a quick access for transporting goods. |
| Is there any access to the forest land) if yes, what is the use of the forest land. | There is no forest land along the alignment. |
| Current rates for the land (Government as well as market rates) | The rate of the land differs and the price goes up and down as per location, productivity and distance for irrigation of the land (current rate: around four hundred to six hundred thousand Afghanis) |
| Source of drinking water | The sources of drinking water are wells, streams, rivers and springs in the project area. |
| Loss of residential/commercial structures, if any due to the project | The loss of residential/commercial structures is minimal; there are none in some areas. |
| Loss of community life like any Market Places or community activities to be affected | There will be no loss of community life as such as advised by the local people. However, they advised that there might be loss of some community property like, mosques and burial grounds etc. |
| Is there shortage of water for human consumption | There are shortages of safe drinking water and water for agricultural needs. Some people reiterate the need of irrigation dams and hydropower dams |
| Has there been land acquisition before? If yes, what was the process of land acquisition and compensation package? | According to the local people they don't have any previous experience in land acquisition and resettlement. |
| Is there a protected area (national park, protected forest, religiously sensitive sites, historical or archaeological sites)? if any | There is no such protected area to be affected due to the project. |
| What is the health status, availability of hospitals and over all environmental condition? Is there any chronic disease prevalent in this area and are you aware about HIV/AIDS and STD? | The overall health condition is not good since availability of hospitals and adequate facilities are not so easily available in the project area. Good hospitals are available either in Kabul. There is no such chronic disease prevalent in the area. However, according to the people, the common disease is malaria. Gynecological diseases are also widespread. Few participants, who are educated, aware about the HIV/AIDS or STD. They usually don't prefer to discuss on these topics and did not share any of the information related to this question. |
| Poverty Level: Is the area poor or very poor or well off Education Status: Literate | People having shops and other employment mechanisms are not poor. Unemployed are mostly poor. Most people are illiterate. However, there is a high literacy |
| | meet people are interater newerer, there is a high iteratory |

| Issues | Participants' Opinion, Comments, and Suggestions |
|---|---|
| illiterate etc. | rate (42%) in Badakhshan due to the existence of a large number of schools. |
| Employment Status: Percentage of employment/ unemployment/ underemployment | Unemployment is prevalent in the area and it is acute at some villages. |
| Migration Pattern (If any), inward or outward | Most people return to the district. Outward population movements also occur (mostly towards Pakistan) |
| If the widening of the road necessitates dislocation, where would you like to be relocated? | The correspondents want the Consultant to study and design the roads carefully to avoid dislocation. |
| | |
| What is the possibility of shifting the religious structure (s)? And where to relocate? | People viewed that religious monuments should remain untouched if there is an engineering solution. In case of dislocation, it should be properly shifted to the nearby area within the locality with due consultation with the village community and will be paid for by the government. |
| Type of compensation expected (Cash or Kind) | Most of the people opted for cash compensation. |
| Perceived benefits from the project | According to the local people, the proposed project will enhance the communication system and people will stay connected to the main stream. The mobility will be enhanced which will allow them to do more business. There will be savings in time as far as travelling is concerned. The proposed project will fetch some temporary employment opportunities to the local community. Additionally, more number of traffic will pave the way to do new business along the highway. |
| Perceived losses from the project | Land acquisition and resettlement will be the major issue. |
| What other organizations of a social nature (NGOs/CBOs/ Civil Society) active in the area? | People are aware about many donor and other agencies working for the development of Afghanistan. |
| Any Other Issues you may feel to share | All the participants agreed that the project should start as soon as possible. Local employment should be made for the completion of the road project. Most of the correspondents do not only want road developments but also improvements in building infrastructures such as additional hospitals, schools, and livelihood centers. |
| Comments | useful and they expect the continued consultation in the future also. |

7.6 Information Disclosure:

219. After the completion of the study, the IEE reports documenting the mitigation measures and consultation process will be submitted to the Government of Afghanistan through the Ministry of Public Works (MPW), PMO, and ADB, and will be made available for public review. The affected people and the local communities expressed support for the Project during the consultations as they clearly saw the benefit to the community as well as the region. Consultations and disclosures should be done during project implementation through:

- i. The preparation and dissemination of a brochure in Pashtun/Dari, explaining the affected peoples' entitlements and the procedures for obtaining compensation for temporary disturbances, trees, crops, and land for construction sites and recording grievances; and
- ii. Setting up a formal grievance redress committee with a representation from the affected people. CSC in association with the Contractor will be responsible for managing the effective grievance redress program.



Public consultation with community people at Beharak Bazar on 04/09/2014



Public consultation with community people at Chakaran on 15/09/2014

Public consultation with School Teacher at Murkhan area on 15/09/2014





Public consultation with the Governor of Eshkashim district on 07/09/2014

7.7 Grievance Redressal

220. The various queries, complaints and problems that are likely to be generated among the APs and that might require mitigation, include the following:

- i. APs not enlisted;
- ii. Losses not identified correctly;
- iii. Compensation/assistance inadequate or not as per entitlement matrix;
- iv. Dispute about ownership;
- v. Delay in disbursement of compensation/assistance; and
- vi. Improper distribution of compensation/ assistance in case of joint ownership.

221. An efficient grievance redressal mechanism will assist the APs in resolving queries and complaints. The main objective of MPW in providing redress mechanism is to avoid potential delays on the commencement of construction works for the project; address and resolve the issues and complaints raised by the APs. The APs should be aware of the procedures on the resolution of grievances, which the resettlement team will inform to project stakeholders during project disclosures and public consultations.

222. As the concept on compensation is new to the Government of Afghanistan, the District Director (DD) will design a pro-forma letter to be used by APs for filing their complaints or grievances. Local leaders who are literate will be identified in every project area and made known to APs. These local leaders can assist the APs in filling out the form in every stage of filing the complaint. Additionally, the implementing NGO will help the APs in preparing the grievance and sending it to the concerned authority. The DD will inform the public of this requirement and the procedures for filing complaints and grievances during public consultations.

223. There will be four-stage procedures for redress of grievances and complaints. These are as follows:

- i. Complaints are to be filed at the district governor offices. The district government with the help from Shura, NGO and PMOs resettlement team is obliged to reply and explain the decision within 30 days from the date the complaint was received. The Grievance Redress Committee (GRC) will assist the district governor offices in the mediation and resolution of conflict.
- ii. If AP is unsatisfied or has no reply from the district governor office, grievances can then be lodged with the Province Governor offices. The Governor office will issue the final decision within 45 days.
- iii. If AP is unsatisfied or has no reply from the district governor office, grievances can them be lodged with province Governor Office in Badakhshan. The Governor office will issue the final decision within 60 days.
- iv. The AP always has final recourse through Afghanistan's legal channels and referred to the appropriate courts; however, every effort will be made to avoid this since the system is presently critically weak. Should the AP want to pursue legal recourse, however, MPW through its Provincial Director and implementing NGO will ensure that support is given to the AP to prepare a case.

224. The APs can call upon the support of the NGO to assist them in presenting their grievances or queries to the GRC if necessary. The NGO will act as an in-built grievance redress body. The APs, who would not be satisfied with the decision of the GRC, will have the right to take the grievance to Judiciary. Taking grievances to Judiciary will be avoided as far

possible and the NGO will make utmost efforts at reconciliation at the level of GRC and MPW will make every effort to solve the issue before going to the court as a last resort. The complaints and grievance redress process is shown in Figure 7-1.



Figure 7-1: Complaints and Grievances Redress Process

CHAPTER-8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 **General:** Roles and Responsibilities of Functionaries

225. All personnel in the Project Team, from the Program Director to site personnel are responsible for protecting the environment by ensuring that environmental protection measures are installed and maintained, and established environmental management systems are followed.

226. For all Project personnel, environmental responsibilities arise from relevant legislation and approvals. In addition, the field officers have the responsibility for ensuring that environmental management systems are in place, and are followed as desired.

8.2 Management Plan

227. In order to ascertain whether environmental management system is functioning properly it is necessary to include a program to monitor. The EMP will include environmental management procedure based on environmental study of the Feasibility Study of Beharak to Eshkashim Road Project (TNDIP T4 Project).

228. The EMP will focus on the implementation of mitigation measures during project construction period as shown in Table 8-1. The project implementation will be carried out under the overall supervision of the Planning and Development Section of Ministry of Public Works (MPW) /Ministry of Afghanistan.

8.3 Reporting Procedure

229. Routine Monitoring on Environmental Performance of the project will be reported by project Division/Consultant of MPW/Ministry and copy of the report will be made available to the ADB.

230. **Table 8-1** shows the details project activities, its potential environmental impacts, mitigation measures, organization or person responsible for monitoring.

Table 8–1: Environmental Management Plan

| Activity | Environmental Impact | Mitigation Measures | Responsibility | Monitoring Agency |
|---|---|--|----------------|--|
| Pre-construction | Period | | | |
| Land Acquisition | Loss of income opportunities by the PAPs Disturbance to living place | Avoid cultivable land as far as possible Follow the route affecting minimum number of household Payment of compensation before eviction Supporting resettlement | MPW | Supervision Consultant/ NGO engaged |
| Route survey | Disturbance to community | Avoid un-necessary mixing with people by workers Pay respect to local custom and culture | MPW | Supervision Consultant/ NGO engaged |
| During Construct | lion Phase | | 1 | |
| i) Stone Crusher Machine at the Site. | Dust in air as is apparent from hazy air at the site and surrounding. Increased particulate | Sprinkler of water on boulders and on crushed aggregates throughout the crushing time. Wearing of PPE like masks, goggles, etc by the works. Health checking of the workers at the crushing site. Air quality monitoring | Contactor | Supervision Consultant/ MPW Project Manager |
| | matter in the air. Workers are at health risk | | | |

| ii) Borrowing of fine and course aggregates from stream bed. | Turbidity in water. Risks of erosion if unplanned extraction is done | Collection from low velocity area to allow settlement of sediment in short reach. Extraction according plan and procedure approved by Department of Environment and Ministry of Mines through Ministry of Public Works | Contractor Contractor | Supervision Consultant/ MPW Project Manager |
|---|--|---|--------------------------|--|
| iii) Borrowing of soil from for filling | May degrade quality of land. | Soil should not be taken from agricultural field. It should be extracted not to cause erosion and subsidence in the adjacent habitation of agricultural land. | Contractor | Supervision Consultant/ MPW Project Manager |
| iv) Rock Blasting | Use of explosives may affect habitation nearby if existent. Risk of accident if explosives are not properly managed. | Prior to undertaking any blasting an assessment of the area will be carried out to identify if there is any habitation likely to be affected. Evacuate the population living in the risk zone and pay compensation for relocation and loss of work time. Undertake "controlled blasting" so that earth and rock- wastes from blasting could be controlled and eventually disposed at an environmentally safe location | Contractor | Supervision Consultant/ MPW Project Manager |
| | Strewing of debris around the blasting site. | Arrival and dispatch to work site to be done under security and properly accounted and monitored. Blasted material to be disposed as per previously approved plan | | Supervision Consultant/ MPW Project Manager |

| v) Hill cutting by method other | Deterioration of soil quality. | Soil material should be disposed or used as per approved plan. | Contractor | Supervision Consultant/ |
|---|---|---|------------|--|
| than blasting | Blowing of dust | Plantation of shrubs or weeds to prevent wind erosion. | | MPW Project |
| | if not properly disposed. | Stock cut material in planned area not to block movement of people, workers and equipment. | | Manager |
| | Blockage of | Soil shall not be placed on drainage path | | |
| | movement. | Maintain necessary slope of hill being cut. The fill area is to be given adequate compaction. Erosion protection measures to prevent all kinds of soil movement on the | | |
| | Blockage drainage path | constructed road. | | |
| vi) Extraction of stone/gravel/sand from River and other stream beds. | Unplanned and unauthorized stone collection from the river bed may cause environmental damage | Collection of permission from NEPA and Ministry of Mines through Ministry of Public Works and maintain procedure laid down in the permission order. | Contractor | Supervision Consultant/ MPW Project Manager |
| vii) Construction of bridges and culverts | Turbidity in water. Sedimentation in bed. | Foundation of culverts is to be made before spring, so that sediment does not travel into water. Bridge foundation work should be done in such a manner not to allow sediment to move down stream. Close meshed net may be used to arrest flow of sediment. | Contractor | Supervision Consultant/ PWD Project Manager |
| | Obstruction to movement by vehicles using the river bed or valley. | Diversion for vehicles is to made for vehicles using the road | | |

| viii) Transport and equipment movement. | Excessive dust polluting to the air of the surrounding the line of operation. | Equipment movement should be with limited speed. Speed barrier set up and Traffic signs installed. Vehicle axle size has to be defined and controlled in accordance with the road condition. Ensure provision of signals and manned gates at crossing point of roads; maintain access roads and watering to reduce dust. | Contractor | Supervision Consultant/ MPW Project Manager |
|--|--|---|-----------------------------------|--|
| ix) Storage of Explosives chemicals in camps and work area | Risk of accident and pollution | Chemicals and fuel should be stored in designated area properly guarded and secured. Explosives are to be kept in magazines safely guarded. Receipt and dispatch should under security control. Vehicles for transportation should have security and have special accident control measures. | Camp Supervisor/ Contractor | Supervision Consultant/ MPW Project Manager |
| x) Noise and vibration in habitation area. | Disturbance to community and hazard for workers. Workers at risk of exposure to high level noise. | Noise level should be within allowable limit. Low noise generators are to be used at camps and rock crushing area. Post evening work prohibited in habitation area. A noise resistance barrier can be provided to prevent noise/sound for the community/school people, Workers are to provided with PPEs and proper use is to be ensured, | Camp Supervisor/ Contractor | Supervision Consultant/ MPW Project Manager |
| xi) Cutting of trees | Floral abundance will be reduced | Replacement plantation at road side so that at least same numbers of trees survive after nursing period (3- fold of cutting trees). | Community/NG O if contracted | Supervision Consultant/ MPW Project Manager |
| xii) Fuelling of vehicle and equipment | Pollution of soil and water | Fuelling in designated area Use of drip pan when transferring fuel In case of spill immediate scratching out of soil and disposal in environmentally safe manner. | Contractor | Supervision Consultant/ MPW Project Manager |

| xiii) Use of outside labor | Commotion may be created in the area. | | Contractor | Supervision Consultant/MPW Project Manager |
|--|---|---|------------|--|
| xiv) Employment of Child Labor in the Construction Activities : | May create student children | Child Labor shall not be employed Unskilled labour should be hired from the locality. Skilled labour is to be searched first locally. If not available may be taken from outside and community leaders appraised of the situation The Environmental and Social Safeguard Policies of the Asian Development Bank prohibits all kinds of child labor (lower than 14 years) engagement in construction works of Bank financed projects. Recruitment shall guard against engagement of child labour. | Contractor | Supervision Consultant/ MPW Project Manager |
| xv) Labour in large number in camps and social communication | Spread of communicable diseases. | Vaccination of the labour against communicable diseases. Prohibition of mixing with local community Regular meeting and interaction with local leaders in respect of social communication | Contractor | Supervision Consultant/ MPW Project Manager |
| xvi) Unhygienic condition in labour camps and workshop | Occurrence of disease Spread of disease Loss of work time | Supply of adequate and safe water for drinking and other use Proper sanitation system is to be provided in workshop and camps Regular health check in camp | Contractor | Supervision Consultant/ MPW Project Manager |
| xvii) Cooking and use of fire for other purposes | Risk of fire and related hazards | Fire fighting equipment is to be provided at places within the reach of the inmates of workshop and camp | Contractor | Supervision Consultant/ MPW Project Manager |

| xviii) Improper disposal of waste water from camp and work places | Risk of generation of insects and disease carrying vectors. Contamination of water sources. | Waste water should be channelled to treatment pond Pond should be sprayed with insecticide or larvae cite. Water may be disposed after proper treatment | Contractor | Supervision Consultant/ MPW Project Manager |
|--|---|---|-------------------------------------|--|
| xix) Littering of solid waste in the office, workshop and camps | Risk of air and water pollution. Polythene may degrade soil quality | Food waste should be disposed in covered bins and regularly disposed in safe manner. Paper and other waste should be disposed in separate bins. Polythene and other hazardous waste like battery, tube lights should be disposed in separate bins to be transported to recycling centres. | Contractor | Supervision Consultant/ MPW Project Manager |
| xx) Loss of Security of weapons and ammunition used by security staff. | May create unsafe social situation. | Arms should be in safety vaults, when not in use. Inform police about loss or occurrence | Contractor | Supervision Consultant/ MPW Project Manager |
| Operation Stage | | | | |
| xxi) Increase in traffic | Increased risk of accident especially in the habitation area | Installation of traffic signs at appropriate places Motivation of the drivers in driving safely Community motivation | Contractor | Supervision Consultant/ MPW Project Manager |
| xxii) Exhaust Emission | Increased traffic will produce increased exhaust emission. | Transport with proper certification are to be allowed | Road Transport Control Authority | Supervision Consultant/ MPW Project Manager |

| xxiii) Accidental release of hazardous material | May pollute air and water | Transports carrying hazardous material should have measures not to release the cargo to the environment. The transports must maintain permissible speed. | Road Transport Control Authority | Supervision Consultant/ MPW Project Manager |
|--|------------------------------|---|-------------------------------------|--|
| xxiv) Dust in broken part of road | May create extra dust. | Watering at such spot Quick repair. | Contractor | Supervision Consultant/ MPW Project Manager |

8.4 Environmental Management Cost

231. The cost includes the cost of physical works and testing, cost of personnel and mitigation measures that includes plantation, camp operation etc.

232. It is expected that the construction period will be about 3 to 4 years. The costing has been done on the basis of unit rate and depending on the construction period, number of units may be changed. The cost is summarized in Table 8.2

| Item | Unit | Unit Cost, US\$ | Quantity | Total Cost, US\$ | |
|---|----------------|--------------------|----------|------------------|--|
| A) Environmental Costs - Civil Works (included in Co | ontractors civ | vil work package | e) | | |
| 1. Environmental Monitoring (During Construction) | | | | | |
| Air Quality and Dust Monitoring1 | Site | 200 | 28 | 5,600 | |
| Water Quality Monitoring2 | Site | 200 | 13 | 2,600 | |
| Noise and Vibration Monitoring1 | Site | 200 | 28 | 5,600 | |
| Subtotal A1 13,800 | | | | | |
| 2. Environmental Mitigation Measures | | | | | |
| Chemical Storage Compound | Site | 1,000 | 4 | 4,000 | |
| Dust Suppression Measures | KM | 108 | 500 | 54,000 | |
| Provision of Health, Safety, and Environment Manager | MM | 3,000 | 36 | 108,000 | |
| Re-vegetation of Slopes (grass turfing) | LS | | | 200,000 | |
| Noise Mitigation Measures | locations | 10,000 | 2 | 20,000 | |
| Rehabilitation of quarry and borrow sites | Item | 2,500 | 4 | 10,000 | |
| Subtotal A2 | | | | 396,000 | |
| Total A (A1+A2) | | | | 409,800 | |
| B) Environmental Costs - PMU Budget | | | | | |
| 1) CSC Environmental Specialists (International/Domest | ic) | | | | |
| i. Remuneration and Per diems | MM | 15000 | 6 | 90000 | |
| Domestic Environmental Specialist | MM | 3,000 | 12 | 36,000 | |
| ii. Travel | | | | | |
| International Travel | Trip | 2,500 | 4 | 10,000 | |
| Subtotal 'B1' | | | | 46,000 | |
| 2) Environmental Monitoring of Project (during operation) |) | | | | |
| Air Quality and Dust 1 | Site | 500 | 8 | 4,000 | |
| Noise and Vibration 2 | Site | 500 | 18 | 9,000 | |
| Subtotal 'B2' | | | | 13,000 | |
| Total 'B' (B1+B2) 149,000 | | | | | |
| C) Other Environmental Costs - PMU Budget | | | | | |
| 1) Equipment for Environmental Unit of PMU LS | | | | | |
| 2) Road Safety Campaign | LS | | | 10,000 | |
| 3) Environmental and Social Management Training | | | | | |

 Table 8.2: Environmental Management Cost

| Item | Unit | Unit Cost, US\$ | Quantity | Total Cost, US\$ |
|--|--------|--------------------|----------|------------------|
| i. Remuneration and Per diems | | | | |
| International Environmental Specialist | MM | 15,000 | 1 | 15,000 |
| International Social and Resettlement Specialist | MM | 15,000 | 1 | 15,000 |
| Domestic Environmental and Curriculum Specialist | MM | 3,000 | 2 | 6,000 |
| Domestic Social and Resettlement Specialist | MM | 3,000 | 2 | 6,000 |
| ii. International Travel | RT | 2,500 | 2 | 5,000 |
| iii. Logistic and Trainees Allowance | Person | 100 | 80 | 8,000 |
| Subtotal 'C3' | | | | 70,000 |
| Total 'C' 70,0 | | | | |
| Grand Total (A+B+C) | | | | 628,800 |

¹ Major Villages and Urban areas: Beharak, Warduj, Zebak, Eshkashim,

² At 3 Locations: Beharak, Warduj, Zebak, Eshkashim

³ Landscaping of project road by plantation or grass turfs of 150m–200m strip

233. Here it should be mentioned that a separate tree plantation program and road maintenance program has been prepared in the previous chapter no -6 clause 6.3. Where total \$216,815 for tree plantation and \$370,000 for road maintenance, training etc., cost.

234. So, Grand total for Environment Management Cost would be= \$628,800 USD for PMU Budget and \$ 586,815.00 USD for tree plantation and road maintenance, salary, training etc. = \$1,215,615 USD (Twelve Hundred Fifteen Thousand and Six Hundred Fifteen USD).

8.5 Environmental Monitoring Program

235. Environmental monitoring is a very important component of environmental management during construction and operation stages of the Project to safeguard the protection of environment. During construction, environmental monitoring will ensure the protection of landslide, side slopes, and embankment from potential soil erosion, borrow pits restoration, quarry activities, siting of work sites and material storages, siting of batch, concrete and asphalt plants, preservation of religiously sensitive locations, community relations, and safety provisions. During operation, air, noise, and surface water quality monitoring and greening and landscaping of Project road will be important parameters of the monitoring program.

236. In response to environmental impacts identified during the study, an environmental monitoring plan has been developed and is presented in Table 8-3. The contract documents will contain a listing of all required mitigation measures and a time frame for the compliance monitoring of these activities. The monitoring will comprise surveillance to check whether the contractor is meeting the provisions of the contract during construction and the executing agency during the operation of the Project.

237. A budget (Table 8.2) is allocated for implementing the environmental monitoring program and mitigation measures provided in the IEE. The proposed environmental budget is \$1,215,615 USD. The environmental management budget under PMU during construction and operation stages are \$149,000. In addition, a budget of \$10,000.00 is provided for road safety campaign, procurement of office equipment for proposed environmental and social management unit of PMU, and environmental and social management training. MPW-PMU will retain a recognized organization for environmental monitoring and ensure that the road is monitored regularly for the first 2 years of its operation.

238. The CSC in cooperation with MPW-PMO and NEPA during project implementation will be required to:

- i. Develop an environmental auditing protocol for the construction period, and formulate a detailed monitoring and management plan; and
- ii. Supervise the environmental monitoring regularly, and submit quarterly reports based on the monitoring data and laboratory analysis report: the main parameters to be monitored by the contractor are outlined in Table 8-3.
- iii. The contractor will be responsible for subcontracting data collection of environmental monitoring to a recognized organization. The cost for this monitoring is included in the environmental mitigation budget in Table 8-2.

8.6 Monitoring Requirement

239. Monitoring includes during pre-construction, construction and operation phases. The probable schedule is given Table below:

Table 8-3: Environmental Monitoring Program during Pre-Construction, Construction, and Operation Phase

| Environmental Parameters | Parameter to be Monitored | Location | Monitoring procedure | Frequency | Responsibilities | Cost |
|---|--------------------------------------|------------------------------|---|------------------------------------|------------------|--|
| Pre-Construction | Period | | | | | |
| Proper Compensation | Land acquisition and resettlement | Road Corridor | Payment of compensation and resettlement will be made through Bank account/NGO | As required till full resettlement | PMU, CSC | Included in land acquisition budget |
| Construction Peric | od | | | | | |
| Appropriation of borrow materials | Overall site | Quarry Site | Visual inspection of quarry sites | Monthly | CSC, PMU | Fees of environmental consultants of CSC |
| Proper closure of quarry sites | Overall site | Quarry Sites | Visual inspection of quarry sites | Monthly | CSC, PMU | |
| Containing spill of fuel, lubricant and chemicals | Polluting materials | Material Storage Site | Visual inspection of material storage sites | Monthly | CSC, PMU | |
| Erosion control | Erosion | Project alignment | Visual inspection of erosion prevention measures | Monthly | CSC, PMU | |
| Rock blasting and scaling | Management of rock debris | Blasting and scaling sites | Observation of blasting procedure and debris management | Prior to schedules of work | CSC, PMU | |
| Waste Management | Waste | Construction camps | Visual inspection of solid waste management | Monthly | CSC, PMU | |
| Water pollution control | Surface Water Quality | Bridge construction sites | Visual inspection of water management | Monthly | CSC, PMU | |

| | TPH, DO, BOD, SS, conductivity, turbidity, pH, temperature | Directly downstream of river and quarry site | Laboratory analysis of water samples | Once before commencement of construction works (baseline) and subsequently at least 2 times a year or after a pollution event | Contractor | 2,600 |
|-------------------|---|---|---|---|------------|-------------|
| Air pollution | CO, NOx, Dust, and SPM | Major settlements, asphalt and batch plants | Laboratory measurements of air samples | Once before commencement of construction works and subsequently at least 2 times a year | Contractor | 5,600 |
| | | Batch, Concrete, and Asphalt Plant | Visual inspection of siting and operation of batch, concrete and asphalt plants | Monthly | | Fees CSC |
| | | Dust | Visual inspection of dust suppression measures | Monthly | | |
| Noise abatement | Noise | Settlement areas | Average of 15 minutes measurement of noise level in dBA | Once before commencement of construction works and subsequently at least 2 times a year | Contractor | 5,600 |
| Vibration control | Vibration | Sensitive areas | Visual inspection of vibration control measures | Monthly | | Fees of CSC |

| Plantation | Reforestation | Project alignment | Visual inspection | Monthly | | 200,000 |
|-------------------------|---------------------------|-------------------------------|---|----------------------------|--|-------------|
| Consultation | Community | Project alignment | Consult with government and community groups along the alignment to monitor environmental concerns | Ongoing | | Fees of CSS |
| Operational Phase | | | | | | |
| Noise abutment | Noise | Noise | Average of 15 minutes measurement of noise level in dBA | | | |
| Air pollution control | CO, NOx, Dust, and SPM | Major settlements areas | Laboratory measurements of air samples | Quarterly for 3 years. | PMU, NEPA | 54,000 |
| Road safety campaign | Road Safety | Project alignment | Collect road accident data | Twice annually for 3 years | PMU | 10,000 |
| Road side plantation | Reforestation | Project alignment | Ongoing monitoring of reforestation activities | Twice annually for 4 years | PMU, Local groups of women or landless people | 216,815 |

PMU = Project Management Unit; MPW = Ministry of Public Works; EHSM - Environmental, Health and Safety Manager; NEPA = National Environmental Protection Agency; CSC = Construction Supervision Consultant; NGO = Non-Governmental Organization

CHAPTER-9: FINDINGS AND RECOMMENDATIONS

9.1 Findings and Recommendations:

240. On the basis of study conducted for the Initial Environmental Examination, the major issues and recommendation for the proposed project have been summarized herewith.

- i. The project will not cause major environmental problems, resulting from its implementation,
- ii. The drainage along the road will not be adversely affected because of provision of side drains and additional culverts being put-up
- iii. The existing road is made of gravel or earth. The road is narrow, bumpy and has a poor condition and generally dusty. This problem will be solved with the proposed re-construction work,
- iv. Improved road signs and awareness display boards will prominently be placed at habitation and sensitive sites,
- v. The proposed project improvement / rehabilitation work will result in lesser air pollution than "No built" alternatives as dust generated now dirt pavement will be significantly reduced.
- vi. The project road does not run through protected / sensitive natural territories viz. natural habitats, reserve forests, ecological sensitive areas, nor will it negatively influence any wild life or endangered species,
- vii. There are no archaeological monuments in the project area,
- viii. Contractor will be required to maintain the construction sites, keep it clean and provide appropriate facilities for the storage of all waste until it is disposed,
- ix. Work force for the project will be provided with adequate water supply, sanitary latrine with septic tanks connected to soak pits, health care facilities,
- x. The Project proponent (MPW) will manage and monitor the implementation of recommendations made in the IEE.
- xi. The environment specialist of the construction supervision will supervise the implementation of the mitigation measures by the contractors,
- xii. Intensive discussions regarding construction / rehabilitation of the road were carried out during the field visits in 4th of September, 9th and 15th of September, 2014 by the Environment Specialist. The people consulted, have generally welcomed the proposed project,
- xiii. Provision has been made in the project cost estimate for the environmental monitoring of the mitigation measures during construction.

9.2 Summary of Potential Impacts:

241. A brief summary of the potential impacts on various environmental issues due to the present activity and Professional Recommendations is given below in the Table-9-1.

| SI. No. | Environmental Issues | Impact Potential | Recommendations |
|------------|----------------------|------------------|--|
| 1 | Topography | No Impact | Proper precaution measures should be taken up during the earth work. |
| 2 | Soils | Insignificant | Control erosion with proper |

Table: 9-1: Summary of Potential Impacts

| SI. No. | Environmental Issues | Impact Potential | Recommendations |
|------------|--|---------------------------------|--|
| | | impact | compaction during construction. Oil and lubricant leakage from the vehicle (if any) should be stopped and take remedial measures immediately after noticed the same. |
| 3 | Climate | No Impact | No change in climatic condition of the area. |
| 4 | Surface and Ground Water | Insignificant impact | Warduj River and Wijling River and few canal exists which will not cause of any pollution for the project. |
| 5 | Geology/Seismology | No Impact | No change |
| 6 | Ecological Resources | Positive impact | Improved road conditions will reduce the fuel consumption, travel time, dust emission on road side vegetation |
| 7 | Community and Population | Positive impact | People will have access for communication, transportation, market and educational institutions |
| 8 | Industrial issues | Positive impact | Roads will facilitate the transportation of industrial products and generate employment |
| 9 | Institution | Positive impact | Roads will facilitate the growth of the institution by better access |
| 10 | Transportation | Positive impact | Significant improvement to Afghanistan Highway efficiency |
| 11 | Land Use | No impact | It is a rehabilitation project and land use will not change significantly |
| 12 | Induced Development | Positive impact | Tourism and commercial activity will increase |
| 13 | Electrical Power | Indirect positive impact | The growth and installation of power infrastructure will facilitated by road rehabilitation |
| 14 | Socio-economic values | Positive impact | Access to Market and social services will improve |
| 15 | Public Health | Positive impact | Access to public health institution will increase and the health of the people will improve |
| 16 | Public Health in Construction camps | Insignificant impact | Provision for construction camp Hygiene |
| 17 | Aesthetic Resources | Positive impact | Improved road will enhance aesthetics of the area |
| 18 | Cultural Resources | Positive impact | Increased tourism |
| 19 | Air Quality (Construction period) | Localized and short term impact | During construction precaution should be taken to minimize dust pollution |
| 20 | Air Quality (Operation period) | Insignificant impact | Smooth movement of vehicle will reduce the air pollution |

| SI. No. | Environmental Issues | Impact Potential | Recommendations |
|------------|--|---------------------------------|--|
| 21 | Noise pollution (Construction period) | Localized and short term impact | During construction precaution should be taken to minimize noise pollution |
| 22 | Noise pollutionInsignificant(Operation period)impact | | Smooth movement of vehicle will reduce the noise level |
| 23 | Water pollution (Construction period) | Lesser degree | During up gradation of road precaution should be taken to minimize the water pollution |

9.2 Conclusion:

242. The implementation of the road project has been studied under one option though two more options initially considered was found unworthy of study. On the basis of the available information, field visit of the entire length of the project road under the two options, discussion with the project sponsors, the engineering consultants, NGOs, local people and various governmental officials of Afghanistan, it was concluded that the road rehabilitation project will not adversely affect the environment of the region, if project specific mitigation measures are taken. The comparative advantage and disadvantage of each option is given in tabular form below:

243. This IEE concludes that the insignificant environmental impacts arising from the project will be minimized to acceptable levels through the implementation of clearly identified mitigation measures. Therefore IEE is considered to be an adequate environmental assessment for the project of Beharak to Eshkashim Road. A monitoring program for the environmental impacts and corresponding mitigation measures will be undertaken to ensure proper implementation of the project.

244. Improvement of the project road will positively help in improving the existing environment conditions of the project influence area. There will not be any comprehensive, broad, diverse or irreversible adverse environmental impact of the project and hence additional study may not be required. However, during construction period appointment of an Environment Specialist is required to look after the implementation of the recommendations made in IEE, so that construction work becomes environmentally sustainable.

245. Finally, it can be inferred that, the project will have an overall beneficial impact after completion in terms of reducing transport cost and fuel consumption of vehicles and also improving socio-economic conditions along the project road. It will have insignificant and short term negative impact on air quality, noise level, water courses and soil during construction period, mostly in uninhabited area. Such impacts will be appropriately monitored and adequately mitigated. At present, this report has not identified any comprehensive, broad, diverse or irreversible adverse impacts caused by the proposed Beharak to Eshkashim Road Project. As per ADB's Environment Guideline, the proposed Beharak to Eshkashim Road Improvement Project requires IEE Report only.

REFERENCES:

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- 4. Project Terms of Reference (TOR), 2014;
- 5. Environmental Policy of the Asian Development Bank, Nov.2002, 2009,
- 6. Impact Assessment and Project Appraisal, Volume 20, number 4. Guilford, Surrey, 2000
- 7. Initial Country Strategy and Program, Afghanistan 2002-2004 ADB, May 2002
- 8. Afghanistan Facts and Figures at a Glance, Update April 2002, UNDP
- 9. Environmental Guidelines for Selected Infrastructure Project, 1990, ADB
- 10. Environmental Policy of the Asian Development Bank, Nov.2002
- 11. The Integration of Biodiversity into National Environmental Assessment Procedures, National Case Studies, Afghanistan, Sept.2001, UNDP, UNEP
- 12. Guidelines for Environmental Impact Assessment of Highway Project, IRC, 1989
- 13. Environmental Guidelines for Rail/Road/Highway Project, MOEF, Govt. of India.
- 14. Islamic Republic of Afghanistan, Ministry of Justice, Year 2000, Issue No.794
- 15. Afghanistan Preliminary Need Assessment for Recovery and Reconstruction, UNDP and ADB, Jan. 2002
- 16. IFPRI Perspectives from relief to recovery: rebuilding Afghanistan, Featured Publication, Vol 24/April 2002 revised June 2002

Annexure 1

Rapid Environmental Assessment (REA) Checklist (Roads & Highways)

Instruction

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the environment and safeguards Division (RSES). For endorsement by Director, RSES and for approval by the Chief Compliance Office.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklist on involuntary resettlement and indigenous people; (b) poverty reduction handbook;
 (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" cases. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

| Country/project | AFG/TNDIP T4 Project/ Beharak-Eshkashim Road Project |
|-----------------|--|
| Title | CWTC |

Sector Division

| SCREENING QUESTIONS | Yes | No | REMARKS |
|--|-----|--------------|---------|
| A. Project Sitting Is the Project area adjacent to or within any of the following environmentally sensitive areas? | | | |
| PROTECTED AREA | | \checkmark | |
| • WETLAND | | V | |
| MANGROVE | | V | |
| ESTUARINE | | V | |
| BUFFER ZONE OF PROTECTED AREA | | V | |
| SPECIAL AREA FOR PROTECTING BIODIVERSITY | | V | |
| B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE | | | |
| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-------------------|----|--|
| Encroachment on historical/ cultural areas: disfiguration of landscape by road embankments, cuts, fills, and quarries? | | V | No encroachment on historical/ cultural sites or disfiguration of landscape is visualized. As is usual with any work involving quarrying, an environment plan for quarries will be required during construction. |
| Encroachment on precious ecology (e.g. sensitive or protected areas)? | | Ø | None. No precious site has been identified along the road. |
| Alternation of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site? | | V | No alteration will take place as all streams will have bridges and culverts with adequate water passage. |
| Deterioration of surface water due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? | | V | During construction of hydraulic structures some silt run-off may take place for very short period. The contract document will have obligatory provisions of appropriate sanitary waste disposal measures. Use of environmentally sensitive chemicals will not be allowed. |
| Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing? | Σ | | Rock crushing, cutting and filling will be away from habitation area. Temporary increase of air pollution along road alignment while preparing and laying asphalt. |
| Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? | | V | The contract document will have obligatory provisions of safety measures for workers. |
| Noise and vibration due to blasting and other civil works? | $\mathbf{\Sigma}$ | | Blasting will be away from habitation area. Temporary noise and vibration during civil work along road. |
| Dislocation or involuntary resettlement of people? | \square | | Limited |
| Dislocation and compulsory resettlement of people living in right-of-way? | \checkmark | | Limited |
| Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups? | | V | |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-------------------------|----------------|---|
| Other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress? | | | |
| Hazardous driving conditions where construction interferes with per-existing roads? | | \blacksquare | |
| Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV.AIDS) from workers to local populations? | V | | If site standards are not adhered to. |
| Create of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents? | | V | The contract document will have obligatory provisions of appropriate liquid waste disposal so that cesspools for breeding of insects are created. |
| Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials? | | V | The road design will provide speed control signs in habitation area. The route is not specifically known for transportation of toxic material. |
| Increased noise and air pollution resulting from traffic volume? | $\mathbf{\overline{N}}$ | | Traffic volume will increase significantly and exhaust emission will consequently increase. |
| Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road? | | Ø | |
| Social conflicts, if workers from other regions or countries are hired? | \mathbf{N} | | Potentially |
| Large population influx during project construction and operation that causes increased burden on social infrastructure and services such as water supply and sanitation systems)? | | V | |
| Risks to community health and safety due to the transport, storage, and use and/or disposed of materials such as explosives, fuel and other chemicals during construction and operation? | | | Explosives and chemicals will be stored in guarded magazines and properly inventoried at arrival and dispatch to work site. Fuel will be stored at earmarked deposed. |

| SCREENING QUESTIONS | Yes | No | REMARKS |
|---|-----|----|---|
| Community safety risks due to both accidental and natural causes, especially where the structure elements or components of the project are accessible to numbers of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning. | | V | |
| | | | |
| Climate change and Disaster Risk Questions the following question are not for environmental categorization, they are included in this checklist to help identify potential climate and disaster risks. | Yes | Νο | Remarks |
| Is the project area subject to hazards such as earthquakes, floods, landslides, tropical cyclones, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix1) | | V | The Project area is in high earthquake zone and in high risky area of the country. Floods also take place occasionally. |
| Could changes in temperature, precipitation, or extreme events patterns over the project lifespan affect technical sustainability (e.g. increased erosion or landslides could increase maintenance costs, permafrost melting or increased soil moisture content could affect sub- grade). | | V | |
| Are there any demographic or socio-economic aspects of the project area that are already vulnerable (e. g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? | | V | |
| Could the project potentially increase the climate or disaster vulnerability of the surrounding area (e. g. by encouraging settlement in area that will be more affected by floods in the future, or encouraging settlement in earthquake zones)? | | V | |

Note: Hazards are potentially damaging physical events.

Protection of Cultural Property

Protection of Cultural Property

Physical cultural Property includes monuments, structures, works of art, or sites of "outstanding universal value" from the historical, aesthetic, scientific, ethnological, or anthropological point of view, including unrecorded graveyards and burial sites. Within this broader definition, cultural property is defined as sites and structures having archaeological, paleontological, historical, architectural, or religious significance, and natural sites with cultural values.

The proposed project is unlikely to pose a risk of damaging cultural property, as the sub-projects will largely consist of repair and reconstruction of existing secondary and tertiary urban access infrastructure. Further, the negative list of attributes, which would make a subproject ineligible for support, includes any activity that would significantly damage non-replicable cultural property. Nevertheless, the following procedures for identification, protection from theft, and treatment of chance finds should be followed and included in standard bid documents.

Chance Find Procedures

Chance find procedures are defined in the law on Preservation of Afghanistan's Historical and Cultural Heritages (Official Gazette, No. 828, 1383/2004), specifying the authorities and responsibilities of cultural heritage agencies if sites or materials are discovered in the course of project implementation. This law establishes that all moveable and immovable historical and cultural artifacts are state property, and further:

1. The responsibility for preservation, maintenance and assessment of historical and cultural monuments rests with the Archaeological Committee under the Ministry of Information and Culture, which has representation at provincial level.

2. Whenever chance finds of cultural or historical artifacts (moveable and immovable) are made the Archaeological Committee should be informed. Should the continuation of work endanger the historical and cultural artifacts, the project work should be suspended until a solution is found for the preservation of these artifacts.

3. If a moveable or immovable historical or cultural artifact is found in the countryside of a province, the provincial governor (Wali) or district in-charge (Woluswal) should be informed within two weeks, and they should inform the Archaeological Committee. In case the immovable historical or cultural artifact is found in a city, the provincial branch of the Department of Maintenance of Historical Values of the Ministry of Information and Culture should be informed within two weeks (art. 18). If the find is made within the center, the Archaeological Committee must be informed directly within one week (art. 25).

4. Failure to report a chance find within the stipulated time limit will be punished with a fine or imprisonment for a period of one week or up to one month (art. 72).

5. If someone intentionally damages a historical or cultural artifact, the culprit shall pay compensation in accordance with the value of the artifact plus be imprisoned for a period of one month to ten years depending on the gravity of the crime (art. 71).

In case of a chance find of moveable or immovable historical or cultural artifact, the implementing agency is responsible for securing the artifact from theft, pilferage and damage until the responsibility has been taken over by the relevant authorities as specified above.

These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the ESM officer/Site Engineer shall monitor that the above regulations relating to the treatment of any chance find encountered are observed.

Relevant findings will be recorded in Asian Development Bank Implementation Status Reports (ISRs), and Implementation Completion Reports (ICRs) will assess the overall effectiveness of the project's cultural resources mitigation, management, and capacity building activities, as appropriate.

Lists of Participants Attended in Public Consultations

Feasibility Study for Baharak - Eshkashim Road Project

Attendance of the Public Meeting held with Male Group at: Eshkashim Governor offic Date: 07-09-2014

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Feasibility Study for Baharak - Eshkashim Road Project

Attendance of the Public Meeting held with Male Group at:

Date: 15-09-2014.



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Feasibility Study for Baharak - Eshkashim Road Project

Translated to English by: Zabiullah Sarwari

District: Eshkashim

| SI. No. | Name | Age | Area/Ward/District | Occupation | Signature |
|------------|---------------|-----|--------------------|------------|-----------|
| 01 | Jawharbik | 54 | Bahar Abad | | Signed |
| 02 | Dost Mohammad | 54 | Darwaz | | Signed |
| 03 | Baray Bik | 60 | Ahangaran | | Signed |
| 04 | Abdul Majeed | 44 | Sheghnan | | Signed |
| 05 | Malek Bik | 78 | Shakmal | | Signed |
| 06 | Sayed Bahram | 45 | Bazgir | | Signed |
| 07 | Gul Ahmad | 51 | Bazgir | | Signed |
| 08 | Gada Mohammad | 63 | Ahangaran | | Signed |
| 09 | Abdul | 38 | Shir | | Signed |
| 10 | Hussain | 44 | Now Abad | | Signed |
| 11 | Shamshir | 56 | Wahdat Abad | | Signed |
| 12 | Mir Bik | 60 | Nowari Shikh | | Signed |
| 13 | Rahmad Dad | 49 | Ashtapa | | Signed |
| 14 | Khuda Bakhsh | 43 | Hairi | | Signed |

Attendance of the Public Meeting Held with Male Group at: Eshkashim Governor Office Date: 07/09/2014

Attendance of the Public Meeting Held with Male Group at: Eshkashim Date: 07/09/2014

| SI. No. | Name | Age | Area/Ward/District | Occupation | Signature |
|------------|----------------------|-----|--------------------|-------------------|-----------|
| 01 | Said Ali | 50 | | Council member | Signed |
| 02 | Sadruddin | 35 | | Council member | Signed |
| 03 | Baz Mohammad | 54 | | District Gov | Signed |
| 04 | Ali Mohammad | 49 | | Mayor | Signed |
| 05 | Bik Mohammad | 55 | | Council head | Signed |
| 06 | Nazar Bik | 46 | | Elder | Signed |
| 07 | Sayed Abdul Hakim | 42 | | Council head | Signed |
| 08 | Islam | 47 | | Council head | Signed |
| 09 | Dayem Shah | 40 | | Council head | Signed |
| 10 | Tuti Shah | | | | |

Attendance of the Public Meeting held with Male Group at: Teacher Training Center Date: 15.09.14

| SI. No. | Name | Age | Area/ward/district | Occupation | Signature |
|------------|----------|-----|--------------------|------------|-----------|
| 01 | Farida | 18 | Khisraw | Student | Signed |
| 02 | Mina | 14 | Khisraw | Student | Signed |
| 03 | Shaima | 16 | Markan | Student | Signed |
| 04 | Karima | 25 | Markan | Teacher | Signed |
| 05 | Nasima | 20 | Brabar | Teacher | Signed |
| 06 | KemiaGul | 20 | Sheghman | Teacher | Signed |
| 07 | Nazagul | 19 | Trang | Teacher | Signed |

Attendance of the Public Meeting held with Male Group at: Warduj Governor Office Date: 15.09.14

| SI. No. | Name | Age | Area/ward/district | Occupation | Signature |
|------------|-------------------------|-----|--------------------|---------------------------------|-----------|
| 01 | Dost Mohammad Khawar | 60 | District City | District Gov. | Signed |
| 02 | Ataullah Sarwari | 30 | Shaigan, Warduj | Sectarian Service Officer | Signed |
| 03 | Raman Gul | 65 | DehdRuz | Elder | Signed |
| 04 | Qari Hafizullah | 40 | Azkhcha | Council head | Signed |
| 05 | Qudus | 47 | Chakaran | Lawyer | Signed |
| 06 | Noor Mohammad | 70 | Hakaran | Farmer | Signed |
| 07 | Zekrullah | 45 | DehdRuz | Farmer | Signed |

| SI. No. | Name | Age | Area/Ward/District | Occupation | Signature |
|------------|---------------------|-----|--------------------|--------------------------|-----------|
| 01 | Mohibullah | 30 | Chakaran, Warduj | Council Head | Signed |
| 02 | Rahim Ddin | 45 | Deh Ruz | Council Head | Signed |
| 03 | Ab.Ullah | 47 | Astain | Council Member | Signed |
| 04 | Asad Ullah | 35 | Astain | Council Member | Signed |
| 05 | Hodidad | 50 | Awar | Elder | Signed |
| 06 | Ab.Satar | 55 | Markan | Council Member | Signed |
| 07 | Jamal Ddin | 60 | Awar | Farmer | Signed |
| 08 | Ab.Rauf | 54 | Deh Ruz | Council Member | Signed |
| 09 | Jalaluddin | 51 | Abjin | Farmer | Signed |
| 10 | Mohammad Rahim | 60 | Chakaran | Farmer | - |
| 11 | Raman Qul | 65 | Deh Ruz | Elder | Signed |
| 12 | Aid Mohammad | 35 | Chakaran | Council Elder | - |
| 13 | Amamuddin | 52 | Chakaran | Labor | - |
| 14 | Zai Uddin | 48 | Chakaran | Labor | Signed |
| 15 | Faiz Mohammad | 44 | Deh Ruz | Farmer | Signed |
| 16 | Abdul Jabbar | 60 | Chakaran | Farmer | Signed |
| 17 | Karim Ullah | 25 | Deh Ruz | Shopkeeper | Signed |
| 18 | Habib Ullah | 27 | Astain | Elder | Signed |
| 19 | Mohib Ullah | 30 | Yakhshira | Farmer | Signed |
| 20 | Mohammad Abrahim | 43 | Yakhshira | Farmer | Signed |
| 21 | Said Agha | 28 | Chakaran | Farmer | Signed |
| 22 | Mohammad Yosuf | 62 | Chakaran | Farmer | Signed |
| 23 | Mohammad Ghani | 29 | Ghanew | District Council Head | - |
| 24 | Abdul Shahid | 46 | Ghanew | Village Council Head | Signed |
| 25 | Saif Uddin | 70 | Ghanew | Farmer | Signed |
| 26 | Abdul Bai | 68 | Mashira | Farmer | - |
| 27 | Naik Mohammad | 65 | Mashira | Elder | - |
| 28 | Habibullah | 58 | Brabar | Council Member | - |
| 29 | Esmatullah | 45 | Brabar | Village Council | - |

Attendance of the Public Meeting Held with Male Group at: Ghanew, Warduj Date: 15/09/2014

| SI. No. | Name | Age | Area/Ward/District | Occupation | Signature |
|------------|-------------------|-----|--------------------|--|-----------|
| | | | | Head | |
| 30 | Mohammad Amir | 55 | Kuch | Village Council Head | - |
| 31 | Kabir Bai | 60 | Kuch | Farmer | Signed |
| 32 | Mulla Hashim | 75 | Zu | Village Development Council Head | - |
| 33 | Abdul Jalil | 45 | Khessraw | Council Member | - |
| 34 | Nasir Uddin | 32 | Khessraw | Council Member | Signed |
| 35 | Mohammad Sabir | 27 | Eshtakhan | Council Head | Signed |
| 36 | Jalil Bai | 59 | Eshtakhan | Farmer | - |
| 37 | Mulla Abdul Basir | 60 | Eshtakhan | Farmer | - |
| 38 | Mohammad Israil | 47 | PulBagh | Farmer | - |
| 39 | Dawlat Mohammad | 62 | PulBagh | Farmer | - |
| 40 | Hasam Uddin | 45 | Azkhicha | Council Head | - |